NEWSPAPER

NCC's 25th Far Cry From Its First

NEW YORK – The 25th anniversary edition of the computer community's annual get-together, opening here next week, will be a far cry from the first Joint Computer Conference which was held Dec. 10-12, 1951 at the Benjamin Franklin Hotel in Philadelphia.

More than 35,000 are expected to attend this year's silver anniversary event compared with the 877 who met at the inaugural meeting to discuss the 10 major computer systems then in existence.

Furthermore, more than 300 exhibitors will be displaying their wares in 943 booths this year; there were no exhibitors at the first meeting and only 20 at the second Joint Computer Conference in 1952.

In addition, this year's National Computer Conference (NCC) – the successor to the previous semiannual "Joints" – will feature more than 140 separate sessions with approximately 500 individual presentations and papers, compared with the 18 papers presented at the first meeting back in 1951.

The purpose of that first meeting was to discuss and compare the characteristics and performance of the 10 then-working large-scale electronic digital computers. The meeting came just nine months after the first commercially produced digital computer – the Univac I – had been accepted by the Bureau of the Census; the first installation of a computer by a business firm was still three years in the future.

This is CW's NCC preview issue. A listing of products on display begins on Page 33; a complete schedule is on pages 42 and 43.

Today there are more than 324,000 computers installed with about 122,000 in the general-purpose category and 202,000 in the dedicated-application or minicomputer category, according to International Data Corp., an industry research firm.

The hot topics at the 1951 meeting included the use of such storage devices as mercury relay lines, magnetic drums and cathode ray tubes. Other

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Users Get Four More Options From HP, CDC

•HP 3000 II Has Faster CPU

By Esther Surden
Of the CW Staff

NEW YORK – The HP 3000 Series II introduced here last week by the Hewlett-Packard Co. (HP) features a faster CPU, faster memory and an enhanced operating system which combine to provide "two to six times the throughput" of its HP 3000 predecessor, according to the firm.

The Series II, with three configurations that range in size from "supermini" to "small general-purpose systems," is software-compatible with the HP 3000, a spokesman said.

The HP 3000's name, basic system architecture and I/O structure have been retained along with its data base, multilingual, multiprogramming and virtual memory capabilities, he noted.

Users of HP 3000 systems can field-upgrade to the Series II's 256K version for $75,000 with an upgrade equipment package, he added. Downtime for the upgrade would be about two days, he said.

The Series II Model 5 is comparable to the Digital Equipment Corp. PDP-11/70 and was designed for sophisticated end users and OEM systems houses, according to the spokesman. The system is meant for use in commercial DP environments as either a stand-alone or as a satellite in distributed processing nets, he said.

The Model 7 "small business system" was designed for users of the IBM 3/10 as an alternative to upgrading to the 3/15 or the low end of the IBM 370 range. It supports both on-line and batch operations, as does the Model 5.

The Model 9, the top of the line introduced, is a general-purpose computer

(Continued on Page 2)

•CDC Cyber 71 Shares Power

By E. Drake Lundell Jr.
Of the CW Staff

MINNEAPOLIS – Sharing the computing power without distributing the computers is the key to the Cyber 70 Model 71 announced last week by Control Data Corp. here.

The medium-scale or "entry-level, large-scale system" follows the CDC tradition – begun more than 10 years ago with the CDC 6600 system – of distributing the processing of system information among central processing and peripheral processing units.

In its most basic configuration, the Cyber 71 has one central CPU and 10 peripheral processors, but this can be increased to two central processors sharing main memory and 20 peripheral processors.

The central unit and all the peripheral processors have to be located at one central site, the firm said, adding the maximum configuration could support up to 500 remote terminals.

(Continued on Page 3)

Consultant Concurs With Jung: SSA DP 'Wasting Millions'

By Edith Holmes
Of the CW Staff

SANDY SPRING, Md. – The Social Security Administration (SSA) is doing unit record processing on third-generation equipment, according to an independent consultant who has done some work for the federal agency.

Commenting on criticisms of the administration by Ferdinand Jung, a programmer employed by SSA [CW, March 29], William Gorman said he agreed with Jung that SSA "is wasting tens of millions of dollars" and that the proposed $69 million computer center building is – at least technically – unnecessary.

But Gorman added that he believes members of SSA Commissioner James Cardwell's staff and the commissioner himself are just as right in stating the agency cannot risk interruption of its operations which result in benefit payments to millions of people.

Issuing its 34 million benefit checks to U.S. citizens each month is "SSA's religion," the consultant said. The justification for this approach to beneficiary accounting is that the system, the basic

(Continued on Page 3)

Procedural Error Foils Scheme That Bilked BC/BS of $128,000

By Catherine Arnst
Of the CW Staff

KANSAS CITY, Mo. – An almost foolproof scheme that bilked Blue Cross-Blue Shield (BC/BS) here out of approximately $128,000 over a two-year period was tripped up only because a procedural error was made on a computer entry form that contained fraudulent information.

Carolyn Johnson, a BC/BS employee for six years and the engineer of the scheme, pleaded guilty recently to charges of using fraudulent medical claims to obtain money from the firm for herself and 22 cohorts, all nonemployees of BC/BS.

The plan worked because the forms contained legitimate names and policy numbers of BC/BS customers, usually friends or relatives of Johnson.

Johnson, a claims examiner, filled out the forms with real policy numbers, false claims and a code directing the check covering the claim to be mailed to the claimants rather than the providers of the medical services (such as doctors or hospitals).

The claims forms were passed through a supervisor to a keypunch operator, where checks were made to ascertain that the person was insured by Blue Cross. Once cleared, the data was input into the BC/BS' IBM 370/158.

The program used to process claims "only checks for errors and not for fraud, so the claim would always be cleared," according to William Welch, the county prosecutor who handled the case.

(Continued on Page 2)

AT&T Reports No Lobbying Funds

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – Despite an intensive Bell System effort to get both Washington legislators and its stockholders to support the Consumer Communications Reform Act, AT&T spent no reportable funds on official lobbying functions during the first quarter of 1976.

Lobbying expenditures for the first three months were published recently in the *Congressional Record* and, for the second consecutive quarter, AT&T reported its registered lobbyist, vice-president of AT&T's Washington office, John G. Fox, spent no money at all that must be reported under the 1946 Federal Regulation of Lobbying Act.

One senator who feels the lobbying requirements are too lenient is Lee Metcalf, (D-Mont.), who recently told the Senate the 1946 act is "distinguished primarily by its hot and cold running loopholes for anyone who wants to wash his hands of public disclosure."

Metcalf has sponsored tougher lobby-

(Continued on Paf

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HP Series Adds Faster Memory

(Continued from Page 1)

comparable to the Decsystem-20 and the lower end of the IBM 370 range, the spokesman said, and was designed for larger commercial or scientific users.

The faster microprogrammed CPU on the Series II incorporates a microprocessor based on a 32-bit biploar read-only memory (ROM). The micro, with a 175 nsec cycle time, contains 209 firmware instructions to control CPU and I/O functions, HP said.

The 18-pin 4K random-access memory (RAM) chips used in the Series II semiconductor memory are said to be 33% faster than the 3000's previous core memory. Memory read/write cycle time is 700 nsec, and maximum main memory is now 512K bytes, four times that available previously, the spokesman said.

The memory reportedly has the ability to detect and correct single-bit errors. Five checking bits determine when a single-bit error occurs in any 16-bit word and pinpoint the failing bit.

The Multiprogramming Executive II (MPE II) disk-based operating system introduced for the Series II supports five programming languages: Cobol, RPG-II, Fortran, Basic and HP's Systems Programming Language (SPL), the firm said.

With MPE II, HP 3000 object programs being executed are separated into permanent program instructions (code) and program temporary values (data), each occupying a separate group of memory locations; the code can therefore be shared among multiple users, it said.

The operating system also supports virtual memory for large program execution, HP said. Only 8% of the operating system resides in main memory at any one time, the spokesman added.

A basic Model 5 includes a 128K-byte fault control memory expandable to 256K; a 15M-byte moving head disk; 1,600 bit/in. magnetic tape drive; and a CRT system console.

The Model 5 can accommodate up to 31 terminals and the user can select up to four line printers, eight 47M-byte disks, three more 15M-byte disks and card equipment, HP said.

Software included is the MPE II, an on-line editor, utility programs and SPL. The basic system cost is $110,000, the firm said.

The Model 7 replaces the 15M-byte disks on the Model 5 with two 47M-byte disks. The Model 7 can include six additional disks, 31 terminals, four line printers and card units.

Included in the basic Model 7 price of $150,000 is the software for the Model 5 plus Cobol, RPG-II, and HP's Image data base management software.

The Model 9 has a minimum main memory of 320K bytes expandable to 512K. Standard hardware is the same as that of Model 7; the configuration can be expanded to include seven additional tape drives, four line printers, 340M bytes of additional tape drives, four line printers, 340M bytes of additional disk capacity, card equipment and a maximum of 63 terminals.

The Model 9 comes with all five languages and the Image software and costs $190,000.

Full-payout lease plans are available.

An IBM 2780/3880 emulator for remote job entry is optional on all Series II models, the firm said.

HP is at 1501 Page Mill Road, Palo Alto, Calif. 94304.

Amdahl Reacts to IBM Price Cuts

SUNNYVALE, Calif. – Reacting swiftly to IBM's memory price reductions [CW, May 24], Amdahl Corp. here slashed its memory prices for the 470V/6 by up to 38%, the firm said last week.

However, CPU prices were raised on the system, giving a net effect on system prices of a 5% average reduction with higher reductions on systems with larger memory and retaining the differential between the Amdahl prices and IBM's.

Under the new prices, users with a 1M-byte system would pay more – $3.85 million compared with $3.75 million before. The CPU increases and memory decreases balance out on a 2M-byte system with the old price of $4.05 million reduced slightly to $4.03 million.

The largest reductions come in the larger memory sizes with an 8M-byte system reduced from $6 million to $5.235 million.

Error Foils BC/BS Bilk Scheme

(Continued from Page 1)

"As long as the claims are prepared with good data, it is a beautiful setup," Del Sharp, vice-president of computer services at Blue Cross, agreed.

What finally destroyed this "beautiful setup" was a procedural error. One of the persons involved in the scheme who did not work for BC/BS knew how the process operated and filled out her own form, rather than letting Johnson do it.

She made an error, however, and the claim was rejected when the data was input.

That claim, which was for $1,200, went to a quality control supervisor who called the doctor listed as the provider and learned the operation had never been done. An audit was then done of all claims that had been paid to BC/BS members; the fraudulent ones were traced back to Johnson and 23 indictments were handed down last October.

The perpetrators of the fraud would have been caught even if an error had not been made, Welch said, noting there is a certain limit to the size of a claim that can be input directly into the computer without a supervisor's approval.

"Somebody would have finally broken down and tried to go over the limit," he said.

BC/BS has added several safeguards to ensure this type of fraud does not recur, such as software and hardware traps and some internal policy changes, Sharp said.

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Cyber 71 Shares Central, Peripheral Processor Power

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Each of the central processors in the Cyber 71 system features 25 operating registers divided between operand, address and index functions, with memory protection and error checking supported by additional registers.

The system runs under the CDC Network Operating System (NOS) and Network Operating System/Batch Environment (NOS/BE), previously available with the firm's Cyber 170 line.

In the CPUs, instructions are handled on a register-to-register basis, resulting in an instruction rate of 1.2M instruction/sec with a single-processor configuration or 2M instruction/sec in a dual-processor configuration.

Main memory for the system is either 65K, 98K or 131K (60-bit) words whether the unit is a single- or dual-processor configuration, since the memory is shared between the two in the dual processor, the vendor said.

The memory is organized in logically independent 4K-word banks which are overlapped and phased, according to CDC. In addition, extended memory ranging from 250K words up to 2M words is available. This memory is also shared in the dual configuration.

While actual data transfer rates depend on the number of memory banks used and the speed of the equipment connected to the system, the optimum rate is up to 10M word/sec with block transfers between main memory and extended memory units, CDC said.

The system can handle a total of 20 peripheral processors which are independent and programmable, CDC said. Each of these units includes 4K words of memory, 63 instructions and three registers, the firm added.

All of the peripheral processors use an identical instruction set and operate with a 1 μsec cycle time. They interface to system peripheral equipment and the central memory through a group of 12 to 24 bidirectional I/O channels, CDC said.

The number of I/O channels on the system increases in relation to the number of peripheral processors. A system with 10 peripheral processors would have 12 channels, a unit with 14 peripheral processors would have 18, one with 17 processors would get 21 channels and a full system with 20 peripheral processors would have the full 24 channels.

Each peripheral processor has access to the full set of I/O channels on the system for communications either with the central memory or the peripherals attached to the system.

The peripheral processors perform data formatting, address calculations, directory and pointer processing, character comparisons and conversions, CDC said.

A configuration capable of supporting up to 256 teletypewriter-compatible terminals would have two central processors and 14 peripheral processors.

Peripherals on such a system would include eight spindles of 844-21 disk storage for a total of 944M characters; two 7054 disk controllers, six 657-2 tape drives, one 3518 tape controller, a card reader and controller, a line printer and controller and four multiplexers.

The purchase price for that configuration would be $1,117,500 and the lease price would be $24,240/mo on a three-year contract for the hardware alone.

The system software for such a configuration would be an additional $6,000/mo or could be purchased for $225,000, the firm added. Deliveries will begin in July.

Consultant Agrees With Jung on SSA

(Continued from Page 1)

processing, works, he noted.

Gorman had access to the internal environs of the four-acre computer room at the agency's offices in Woodlawn, Md., for a period of months. He was not there to do performance evaluations of the SSA's DP operation, but to find and correct specific problems and to implement some outside software.

Yet, having been there at all hours of the night and day and on weekends and holidays as well, his observations led him to believe there are a number of procedures that could be instituted to bring the agency's data processing into the 20th century.

First and foremost, he suggested selective use of SSA's files. The agency presently uses its entire master file for every run, even though there are a comparatively small number of transactions to be processed from that file.

The hit ratio of transactions to the overall file is 1/100 of 1%, Gorman said. Yet every time the master file, containing some 28 million accounts by Social Security numbers (SSN), is updated, all accounts are updated even if they have seen no activity.

Gorman wondered whether the agency's daily processing might be done against a subset of its huge master file. The "daily" master file would contain only the more active SSNs, he said. The entire master file could be updated on a monthly basis.

SSA personnel attend seminars on large-scale data base management and mass-storage techniques, he said. But this technology and its possibilities never seem to make it back to actually impact the DP operation at the agency.

Scheduling of machine time represents another area where the administration could save money through utilizing its hardware better, the consultant commented. "At some hours, there is precious little running of equipment at all; at other times, the machines are overworked," he said.

Capacity is probably where it should be during the regular business day shift, Gorman added. It's the second and third shifts and the weekends that see very little CPU activity.

Gorman also suggested SSA is assuming risks of great proportion by putting all of the agency's processing essentially under one roof.

"Distributed processing is probably a concept unknown to SSA's commissioner and his staff. They cannot be expected to know the DP business, so they must take the advice of their senior technical management," he said. "That management wanted a comfortable, modern edifice to house its systems.

"The very nature of those systems is the reason the commissioner and his staff must go along with those plans and why Jung and others like him were unable to change things," Gorman continued.

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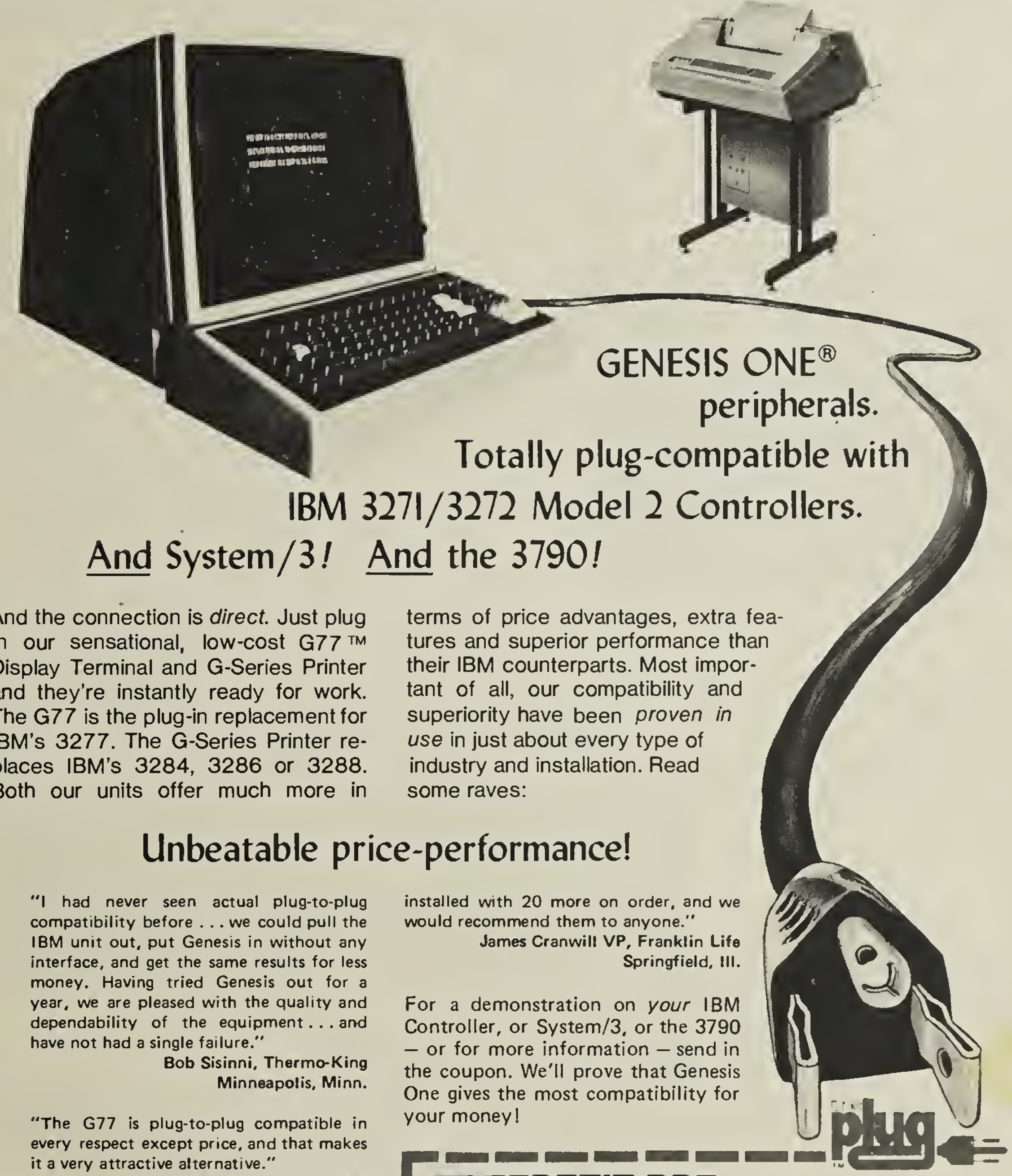

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Checkout Time Reduced 26.5%

Scanning's Greatest Savings Found in Front-End Labor

By Catherine Arnst
Of the CW Staff

SAVERNA PARK, Md. – The greatest savings for a supermarket using a computerized scanning system would come from the reduction of front-end labor, a recent study conducted by Giant Supermarkets found.

The reduction of front-end labor would result in a savings of 42% of the total savings per month available to a store using scanning, Giant said.

Removal of prices in favor of the Universal Product Code (UPC) label would constitute another 23% of the savings, it added.

The figures were derived from observations made in two of Giant's stores with scanning equipment; one store used only the UPC label as a price indicator.

Giant's intent was to determine the effect of scanning on a store whose gross sales volume is $140,000 per week.

The estimated savings available to such a store would be $12,055, Giant concluded.

The "effective hourly wage" used to calculate savings (the wage per hour plus overtime, vacations and other fringe benefits) was $8.175 for checkers and $8.538 for grocery clerks.

Checkout Time Reduced

The front-end labor savings that could evolve from a scanning system is the "reduction of the total time to check out a customer, which consists of the ring-up, cash transaction handling and bagging times," the study said.

The amount of time it would take to process an order in a store could be reduced by 26.5% if a computer-assisted scanning method were used, Giant calculated.

To determine how much employee time was used in the front-end process, the company monitored the number of hours per week spent checking and bagging.

> *'The reduction of front-end labor would result in a savings of 42% of the total savings per month available to a store using scanning.'*

It came up with 459 hours per week spent checking for all employees, 27.5 hours per week bagging and 3.5 hours per week helping another checker bag – in the $140,000/week store.

To calculate the savings a scanning system would offer, Giant assumed bagging assistance could be eliminated, multiplied the time spent checking by .265 and multiplied the result by the effective hourly wage. The resulting figure was $5,112 in savings per month.

Easier to Achieve Savings

The price marking savings a scanning system would provide a store were assumed to be much easier to achieve than those savings which require "the implementation of special disciplines and management attention such as with front-end productivity. Simply put, nothing has to be done to obtain the entire benefit," Giant said.

The chain found it takes an average of 15.5 seconds, or .0043 hours, to price mark a single case of merchandise, and the average number of cases marked during a month is 38,640.

It also found it takes an average of 10 seconds, or .0028 hours, to re-mark a single item; the number of items re-marked per month averaged out to 40,247. Management also spends approximately 10 hour/week reviewing prices.

If these chores were eliminated, the result would be a savings of $2,745 per month, the study claimed. This sum equals 23% of the total savings to a store per month.

Computer-assisted checkout systems eliminate the time spent balancing cash registers and preparing a cash report required by a manual system, the study reported.

The hours saved in performing this function would be 50 per week, which translates into a cash savings of $1,770 per month for the store.

Giant does not use the scanning system's potential capability to log all items as they are sold, claiming it is "one of those areas which implies new disciplines and management attention," as well as the development of a new host computer.

Ordering System Savings

It did, however, estimate the potential savings to a store that an automatic routine ordering system could offer by determining how many hours are now spent ordering manually.

The study concluded that a store could save 31 man-hours per week, or $1,146 per month, by using a computerized ordering system.

The amount a store could save by eliminating under-rings was also estimated in Giant's study. It assumed that "most food retailers believe they are losing money due to under misrings at the checkout. When errors occur, they are more often in favor of the customer than the store."

The only study done in this area was in 1963, when Edward Harwell estimated that supermarkets were losing about .7% of sales due to under-rings. "This number is very large, considering the industry currently earns only about .83% after taxes," according to Giant.

The chain claimed to have reduced the amount of under-rings in its stores by .2% of gross sales, although no study has been done. Giant also estimated that a scanning system would further eliminate 75% of the total under-ring loss. If so, the estimated savings per store would be $909 per month.

Approximately 3% of the savings per month available to a store would be obtained through the elimination of costs involved in replacing mechanical registers, which have an average depreciation life of 120 months, the study claimed. In a store with 12 registers, this savings would equal $373 per month.

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The DOC 2250 also offers: buffered vertical format control; fully-buffered print line; operator-changeable character arrays; Universal Character Set Buffer (UCSB); up to 6-part forms; paper slew up to 100 inches per second; power cover; power stacker.

The DOC 1800 offers all the features of the DOC 2250, but at a reduced printing speed. And a reduced price.

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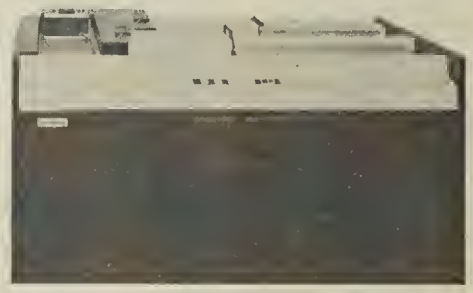

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Supermarkets Say Laws Unneeded

Open Market Should Decide on Item Price Marking

By Catherine Arnst
Of the CW Staff

An open market rather than legislation should determine whether prices should be removed from individual items in supermarkets with scanning systems, supermarkets in a recent *Computerworld* survey agreed.

Legislation is necdless, the supermarkets said, reacting to a study by the Ad Hoc Committee on the Universal Product Code (UPC) which concluded that consumers would not shop at stores that discontinued price marking [CW, April 5].

Of the supermarket chains contacted, five have scanning systems. Only one, Marsh Supermarket in Troy, Ohio, intends to continue leaving off individual prices. Giant Supermarket in Maryland is replacing prices now; two chains are required by state law to leave prices on; and one store never intended to remove prices.

Leaving prices on may please the consumer, but most of the supermarkets surveyed agreed it has discouraged the food industry from adopting scanning systems.

"Price removal is a very attractive incentive" for the supermarket to install a system, Ron Cantrell of Ralph's Supermarkets in California said. Ralph's installed its first scanning system in September 1974 and added four more stores to the system in the past two weeks.

The stores are required to mark prices by a California law that went into effect April 1. Prior to that date, Ralph's left prices off in its first scanning store for "four or five months as an experiment," Cantrell said.

No Customer Reaction

"There was no reaction by our customers. We had built up enough faith in the system so that customers didn't mind. We asked for their comments and got none," he said.

His observation contradicted the Ad Hoc study, which indicated that customers do mind. "The Ad Hoc study was directly addressed to price consciousness," Cantrell said. "We didn't try to measure that."

Cantrell is disappointed that the committee took a stand requiring price marking. "The scanning system is not designed to have the prices left one," he said.

"The person marking the item is going to make mistakes; 99.9% of the time the computer will record the price correctly. The customer will lose confidence in the system if he sees the scanner record a price at the point of sale that is different than that marked on the product.

"We already experienced that problem, particularly during start-up," he said. "And the errors will continue."

"The consumers should make the choice of whether they want to shop at a store with or without prices marked," Cantrell said in reaction to the California law which required his store to put the prices back on.

The Ad Hoc Committee's study found consumers would make the choice, and that choice would be not to shop at a store using only UPC labels as price indicators.

Marsh Supermarket said the study was accurate, but only as a human behavioral study. "It should be measured along with a consumer attitude study," Clyde Dawson, director of research at Marsh, said.

"If you ask customers flat out if they want pricing left on, they will say yes," he said; in surveys done by the store 64% of the customers answered this way. "But if they are told price savings would be had if prices are removed, they are agreeable as long as we keep good shelf pricing," he said.

Marsh, which was the first store to install a scanning system in June 1974, has not lowered prices because of the scanning system, Dawson said. "But we have raised the level of service," he added.

The store is still testing its system, and no decision has been made on whether to leave prices on or off, Dawson said. And although price removal "does offer benefits to the store, it is not the only benefit" to be derived from a scanning system, he said.

"I have to believe customers will profit from scanning. Traditionally, in the grocery industry, any savings that are made by the store through new developments are passed on to the customer through lower prices. Now, supermarkets are operating at a lower level of profit than ever before," Dawson said.

Improved Service

Logli Supermarket in Rockford, Ill., installed its scanning system on one of its three stores in September 1975 and "never had any intention of removing prices," Aleck Johnson, vice-president of the chain, said. "We went into scanning with the idea of improving service and that's what we have done," he said.

There have been no savings to the store since installation because marking all the products with UPC labels has increased costs as has the programming time used every day to update prices in the computer, Johnson said.

The system was worth installing because it has speeded up checkout service, is more accurate and improves customer confidence in the store, Johnson said.

"The customers love it and the consumer groups hate it," he said. "Our sales have continued to increase since installation."

Supermarkets that have scanning systems and continue to mark prices have had almost no feedback, negative or positive, on the new checkout system, according to the CW survey.

First National Stores (Finast) of Massachusetts found the same lack of opposition to its system as Logli's, according to Bob Nolan of that store.

The chain has two stores with scanning systems. The first changed over in February 1975 and the second was installed last August.

When the first system was installed, 30,000 opinion forms were handed out the first two weeks of operation. Nine responses were returned and seven of those were favorable, Nolan said.

Although Finast is required by Massachusetts law to leave prices on, it would like to conduct tests with them off, Nolan said. The Ad Hoc committee's statement will delay the acceptance of scanning systems that much longer because it denies the stores the chance to make tests determing whether price marking is or is not beneficial, he added.

Full Potential Unused

Finast has not yet determined how effective its systems are, Dawson said. Because of item pricing the system cannot be used to its full potential in the area of inventory control, he said.

"Our policy is for the checker to scan the product at least twice. If it doesn't record, he rings in the price manually. This happens quite a bit," Nolan said.

"That's where the data falls down. There is no way of knowing how accurate the information in the computer is; only those items whose prices were scanned are recorded."

Giant has been fighting legislation requiring that prices be marked in Maryland because it wants the opportunity to conduct testing. It left prices off in one of its six stores with scanning systems to determine the effects.

Although its study found that "substantial savings could be realized that could be shared with consumers (see story on Page 4), according to company President Joseph Danzansky, Giant had committed itself to complying with the position taken by the Ad Hoc Committee and so is replacing the prices in that store now.

In return, the Maryland legislature killed a proposed bill to require price marking.

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WANG

AT&T Reports No Lobbying Funds

(Continued from Page 1)

ing rules in the proposed Lobbying Disclosure Act of 1976 (S.2477) which could come up for a floor vote in June, according to a member of the senator's staff.

The senator also has called attention to other ways that large corporations can exert their influence on congressmen and others. One of these is membership on little-known federal advisory committees.

AT&T held more memberships on these committees than any other company with the exception of RCA as of the third quarter of 1974. The Bell System had representatives on 95 of the advisory committees; another listing for the same period showed total AT&T representation at 119 persons.

Admittedly, some of these advisory committees are very specialized in nature and it is unlikely Bell could use them to further political aims. But others are closely tied to regulatory issues that relate to the Federal Communications Commission (FCC) and current legislation.

"What better way could there be for people to work from the inside behind the acceptable facade of a federal advisory committee to promote government give-aways while working together on the outside to defeat legislation perceived as threatening to big business?" Metcalf asked in a speech before the Senate.

AT&T categorically denies such ideas. "These are technical advisory committees and have absolutely nothing to do with lobbying or legislative efforts," an AT&T spokesman said.

Among the 10 advisory committees dealing with FCC issues, AT&T could use the FCC National Industry Advisory Committee and some other standards committees to at least bring out its point of view, some industry sources believe.

In addition to its formal memberships, the Bell System operating companies have sent representatives to Washington to visit members of Congress to impress upon them the importance of the legislation. Illinois Bell was included in a recent state telephone industry association delegation that went to Washington to visit the key legislators.

This is the second in a series of articles describing the efforts being expended behind the scenes to inform Washington legislators and others about the pros and cons of the Consumer Communications Reform Act of 1976 [CW, March 22] now pending in both houses of Congress.

Some of the $50,000 which AT&T said it has thus far spent on the legislative effort [CW, May 24] paid for several brochures explaining the impact of competition and the philosophy behind the AT&T-sponsored legislation.

NCC Opens June 7

(Continued from Page 1)

papers discussed operating and component experience on various calculating machines and the future possibility of using transistors in computer design.

Specific presentations at the meeting – chaired by J.C. McPherson of IBM – included the performance of the Census Bureau's Univac I, the Burroughs Laboratory computer, the IBM card-programmed calculator, the Electronic Research Associates 1101 computer, the Mark 1 developed by Ferranti and the University of Manchester, the Whirlwind 1 from MIT, the National Bureau of Standards' Eastern Automatic Computer and a review of Bell Laboratories' work in digital computer systems.

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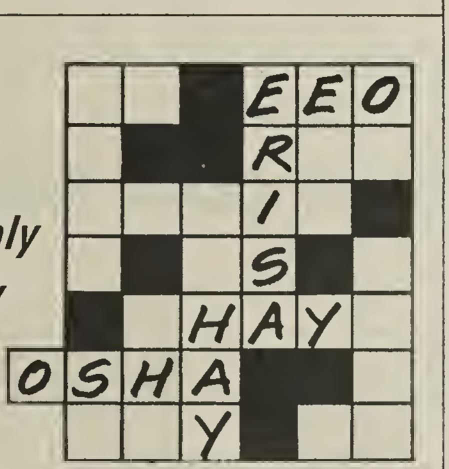

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Rate of Change a Problem

Jargon Seen Stumbling Block for DPers' Attorneys

By Nancy French
Of the CW Staff

SAN FRANCISCO – "The box is in the pen," a speaker who designs software said here recently, instantly befuddling an audience of attorneys.

The speaker pointed out that this phrase has about as much mcaning as the word "software" to an attorney who is trying to understand a DP contract.

"Computer jargon is largely terminology for things invented on the run," according to Gerald H. Larsen, president of Unicorn Systems Co., a Los Angeles-based systems design and consulting firm.

"How do you prove in court, for example, that the programs you contracted for are really 'top-down structured programs'?" he asked members of the Computer Law Association.

Are the contract terms met if the programs are "mostly" top-down structured programs? "If a program contains two 'GOTOs,' does that make it not a top-down structured program?" he asked.

Despite 16 definitions of the term 'software' that Larsen quoted from industry source books and distributed to the attorneys, "the industry still doesn't agree on whether 'software' includes documentation," he said.

Rate of Change

The terms are baffling enough in themselves, he said, but the rate at which words are born and die vastly increases difficulties attorneys experience.

Larsen used the term "firmware" to illustrate his point.

"Firmware was born at a time when systems manufacturers offered systems that consisted of some logic circuits that were given a personality through the use of unalterable software."

Firmware has been superceded by a new type of technology, he said. "We can do the same thing in read/write storage – in modifiable control memory," he explained. Thus, the term firmware is virtually dead.

The relationship between hardware and software within a product keeps changing, he said, and contracts must be rewritten to reflect those changes.

For example, a user bought a Model XYZ-1 a few years ago that consisted purely of hardware. Later he replaced it with the Model XYZ-2 which substituted a programmable microprocessor for some of the hardware.

The user should be protected with a contract change, especially when one considers that manufacturers consistently refuse to take responsibility for software problems, he explained.

This type of situation will become more common as users move into fourth-generation distributed processing, and electronics are replaced by more and more microprocessors.

What are the legal rights of the user who buys the hardware, accepting the software free as part of the device, if the system doesn't work as the manufacturer promised?" he asked.

Larsen also expressed concern for the small user who buys a turnkey system such as the IBM System 32.

In such cases, IBM furnishes the user a kind of questionnaire to complete to help determine the parameters he wants. In return the mainframer generates the Industry Application Package for him.

What the user often doesn't realize is how many decisions are parameter decisions that cannot be altered and how many are not, he said.

When this first-time user installs such a system he may have a six-character numeric customer identification system that seems quite adequate. However, he may learn later that he can't change to a new system without making his future data base completely invalid, he said.

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Ford Signs Science Post Bill

WASHINGTON, D.C. – President Gerald R. Ford signed legislation creating an Office of Presidential Science Advisor here recently.

A final bill had been drafted from two similar bills circulating in the Senate and the House of Representatives early this year [CW, Feb. 16].

When the office will take effect is not known, nor is it known when an advisor will be chosen – or who that advisor or persons on the advisory committee will be, a White House spokeswoman said.

Ford's recent request that supplemental funds be appropriated for implementation of the legislation indicated that the White House will act soon, however, a Senate Commerce Committee source said.

NCIC Check Brings Four Arrests

TIFTON, Ga. – A state trooper who stopped a car that was said to be traveling "erratically" here recently ended up looking down the wrong end of a pistol when he approached on foot.

Fortunately for the trooper, the .25-caliber pistol aimed at him misfired. The trooper succeeded in disarming the driver and radioing for assistance.

When additional state patrol units arrived, the vehicle's four occupants were questioned and identified.

An inquiry of the Georgia Crime Information Center's Law Enforcement Data System (Leds) and the National Crime Information Center (NCIC) revealed the auto had been stolen in Pennsylvania. Further inquiries on the auto's occupants indicated the driver was wanted for armed robbery and murder in Kentucky and one of the occupants was wanted for murder in West Virginia.

A search of the auto and its occupants produced several knives, guns and a small amount of marijuana.

The individuals are now in custody.

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CWJ

Denver Study Finds Small Hospitals Automate First

By Beth Garcia
Special to Computerworld

DENVER – Smaller hospitals in the Denver area may be more progressive than larger ones in computerizing their various operations, a fact that is at odds with the usually held theory that the larger the firm, the more innovative it is.

Surprised at this finding, which "flies in the face of conventional wisdom," the 10 University of Denver graduate students who conducted the 1974 summer study into computer diffusion hypothesized that smaller hospitals may need to innovate relatively early because they cannot afford to pay for additional personnel necessary to perform similar tasks handled on a noncomputerized basis by larger hospitals.

The team pointed out too that hospitals are not "firms" and suggested that smaller hospitals may have more funds for innovation than do the larger facilities.

In addition to discovering the differences in the advance of computer technology among the 15 hospitals selected for a sample, the students found out a little about themselves, too, and what it takes to conduct and complete a research project.

Originally conceived in the "Technology and Modernization Seminar" at the University of Denver's Graduate School of International Studies, the project was funded for $13,400 through a grant from the National Science Foundation's Student Originated Studies (SOS) program. Students were to investigate "The Diffusion and Dissemination of Computer Technology in the Denver Metropolitan Area."

"We soon realized that the project we had conceived would take us five years instead of 10 weeks," the project director, Katherine Nakata, said.

"I think we spent half the summer narrowing it down," according to Tim Collins, one of the 10 involved in the project.

In formulating interviews, Collins found terminology to be a crucial point, noting that "IBM terminology does not apply to Burroughs." Interview training would be an asset for this type of project, he said, recalling the trouble encountered in deciding on questions and limiting interview time.

Roger Morie, another student researcher, pointed to the difficulty in classification. "How do you define a computer?" he asked.

Student Findings

Despite their problems, the students discovered in 10 weeks that, as expected, payroll procedures were the first computerized operations to be adopted by most hospitals; that, with the exception of payroll, a time lag of between four and nine years occurred between the first and second adoption in any one hospital of computerized procedures; and that 1970 was the year that most hospitals began computerizing their medical records and clinical procedures.

Among the eight hospitals in close proximity to one another, five of them have the highest number of computer applications of any in the sample, the student report said.

Among these applications are payroll, accounts receivable, accounts payable, laboratory records, admissions, discharge, surgery reports, laboratory analysis, radiological applications, cardiology, epidemology and clinical surgical applications.

Research interviews also discovered that the use of computers brought increased prestige to the hospital and that while computer use alienated some employees who were fearful of losing jobs, it also helped in a "bringing together" of staff members because of the increased communication needed to make the most complete use of this expensive equipment.

The hospitals in the survey were: Children's Asthma Research Institute and Hospital, Children's Hospital, Colorado General Hospital, Fitzsimons General Hospital, Fort Logan Mental Hospital, General Rose Memorial Hospital, Lutheran Hospital and Medical Center, Mount Airy Psychiatric Center, National Jewish Hospital, Porter Memorial Hospital, Presbyterian Medical Center, St. Anthony Hospital System, St. Luke's Hospital, St. Joseph's Hospital and Swedish Hospital.

One of the frustrations that student researchers encountered was the inability to answer all the questions about computer diffusion, even in this one industry.

Questions proposed for future study were: "Why do individuals, organizations or societies adopt innovations? How does diffusion occur? How important is the competence of advocates of adoption of an innovation in influencing a decision to adopt? Is political clout a more substantial factor than competence? Why aren't larger hospitals the most innovative?"

Though all students acknowledged the immense investment of time and effort in the study, Nakata said: "We gained much more from the practical experiences than any number of courses in research design could teach us."

Privacy Legislation Seen Taking 'Overkill Stance'

By Toni Wiseman
Of the CW Staff

MENLO PARK, Calif. – The privacy legislation which has been introduced so far has taken an "overkill stance," according to Dale Learn, president of Information Sciences, Inc.

"In our 10 years of working with more than 200 organizations on the computerization of employee data, we have never been asked to include political activities, credit ratings and standing with the Internal Revenue Service (IRS) or, for that matter, anything else that might be deemed unethical," Learn said.

While acknowledging there is a continual need to protect confidential information from curious fellow workers, Learn said tight security for keeping files under lock and key and allowing employees to see that information on them is correct and up-to-date are usually successful in this regard.

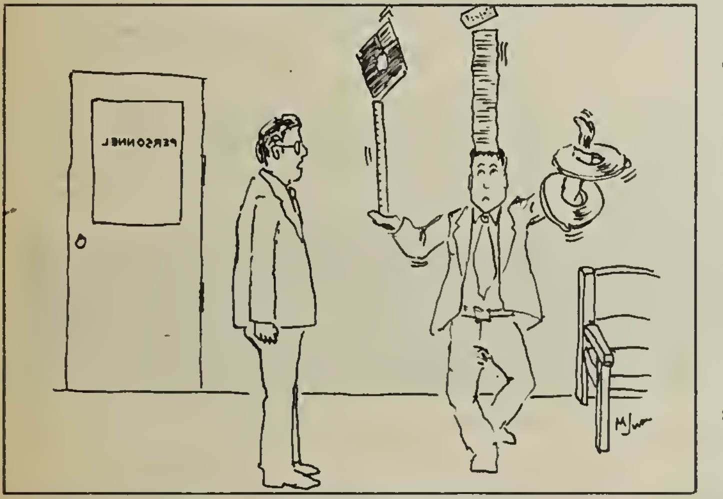
"There is also a prevailing notion that the computer is a depersonalizing force or a threat to individuality," he said. "In our experience, the computer has just the opposite effect.

Key to 'Repersonalization'

"The computer is the key to the repersonalization of society. It is the computer that implements the movement away from treating citizens and employees in the impersonal mass and back to individual assessment on the basis of personal qualifications, aspirations and capabilities, regardless of race, creed, religion, sex or national origin," Learn said.

Learn predicted that employers will find themselves subjected to "costly, burdensome and totally inappropriate" laws in the name of the cause of the privacy.

The potential damage is enormous, he said, while the real purpose of employee information systems is to help management in its "quest to know" and to manage effectively.



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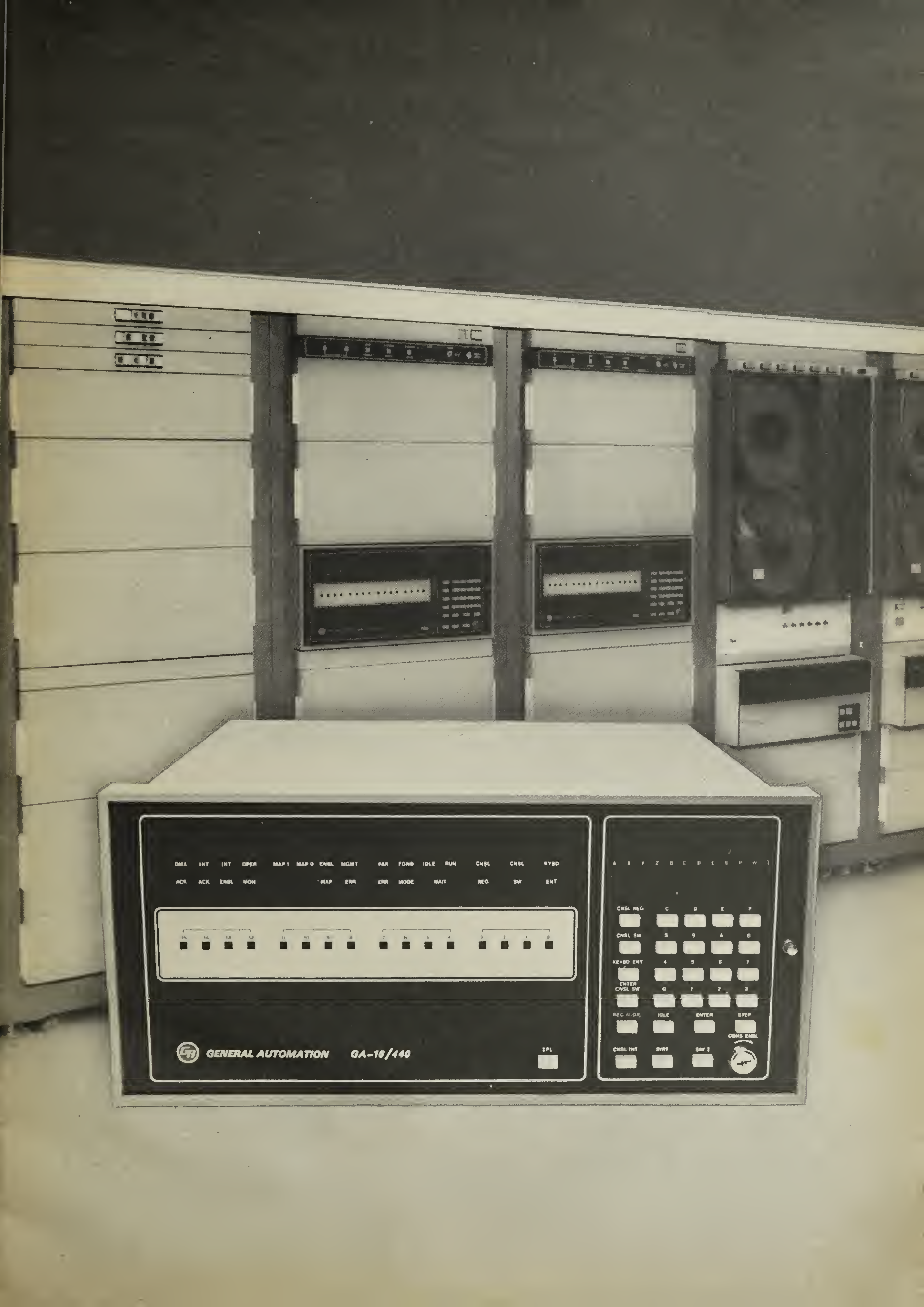
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No Longer 'Wizards of Change'

DPers Told Awareness of Nontechnical World Important

By Don Leavitt

Of the CW Staff

DALLAS – Data processing has lost much of its mystique, and most managers now realize it is important to show the DP staff life outside its own technical world, according to Bill C. Zumwalt, director of DP for Waples-Platter Co.

Since they are no longer "wizards of change," DPers must be communicators, he told a workshop at a recent Computer Caravan. Career paths can be seen now not only in data processing, but through DP to other areas, as the employee's own ambitions and capabilities permit, he added.

Although he encouraged movement within the positions of the staff, he later argued against the formalities of career pathing, job definitions and the like. Management can motivate employees, but it cannot direct them into more than they want to do, he said.

The fact is that anyone interested in moving ahead "already knows what the job he wants requires," and he can find out whatever else he wants by asking, he said. By the same token, such an unstructured approach allows employees to define what they themselves would like to do next, Zumwalt said.

The employee has to define his own goals and understand his own limitations, under Zumwalt's plan. And the approach to this project is just like the approach an analyst would use on any project, he said.

Four Basic Phases

There are four basic phases, although, since humans and uncontrollable factors are involved, the phases may well overlap one another and be repeated as events dictate.

In the first or analysis phase, the employee has to list his or her personal and career wants. And the worker who feels his current position has enough challenge should recognize that that is not necessarily a negative attitude.

In the planning phase, the employee reviews the entire list of wants put together in the earlier phase and selects the goals and objectives to be pursued in particular. To move ahead requires advance planning, Zumwalt said, with definite major and minor accomplishments as goals.

Measurable short-term and long-term objectives keep this phase manageable, although it is "probably the most difficult aspect of the whole process," he commented.

The design and implementation phase of a career plan includes the steps the employee takes to attain the goals set up earlier. Just as simply stated, the review phase is an audit operation to determine how outside changes affect plans and how well the steps taken earlier succeeded.

A More Direct Approach

After Zumwalt described the theoretical approach, a member of the audience told of a more direct means his company uses to make new DP staffers aware of the other parts of the company. "We throw new programmers out in the working units of our operation for at least two weeks.

"After that, they have some time in accounting, to see things from that angle. Then we put them to work in data processing. And it works," he said. "With that preexposure, the terms we encounter working with the user departments mean something."

And to maintain that level of understanding, the DPers are sent back to the field for a week or two of reorientation every year or so, he said. This approach has paid off nicely: The level of contribution and the productivity of DPers with the exposure to the real world is "much better" than for those without it, according to the speaker.

System Seen as Necessity, Not Luxury for Colleges

By John P. Hebert

Of the CW Staff

HANOVER, N.H. – "The computer is no longer a luxury for colleges, but a necessity." It is the single most important element in long-range planning a college can have, according to John G. Kemeny, president of Dartmouth College here.

This is "the most important use of the computer to institutions at this time: for planning – for one year, five years, 10 years and beyond," he told a group of more than 200 women administrators representing 75 colleges who had gathered recently for a two-day conference on the use of computers in educational administration.

The computer allows many people to interchange thoughts and ideas in long-range planning and to play the game of "what if" with such things as rates of inflation, fuel prices and student body size and any and all combinations, he said, citing the necessity of computer modeling in planning.

"Why, in these times of tight budgets, did the board of trustees allocate $2 million for a new computer?" he asked.

"The computer makes the student a little smarter, and it makes the faculty and administration a great deal smarter," he said, answering his own question.

Educational Usage Growing

Using the analogy that a university would not consider operating without a library as a resource or a theater for its drama department or labs for its chemistry department, he cited the growth of computer usage in the educational process.

"Ten years ago, I would conduct a class and then given an assignment and send the students off to the computer. Now I have a terminal and closed-circuit television in the classroom and move between the terminal and the blackboard, using each as a teaching tool, complementing one another," Kemeny said.

"A university that does not provide easy access to computing for its faculty, students and administration is failing in its job and today most universities are failing in this," he continued.

Kemeny also discussed the services an academic computer center must provide, including a first-rate research facility for faculty, free and easy access by students without red tape on a system that is easy to learn and various administrative uses.

These administrative uses were broken by Kemeny into two major segments: the simple uses such as payroll, which are best maintained on a separate computer, and the building of large data bases on the major computer, for a variety of uses.

The Board of Trustees of Dartmouth is so convinced of the necessity of the use of computing in long-range planning that a terminal is available at its meetings and is frequently used to answer questions and provide projections, Kemeny noted.

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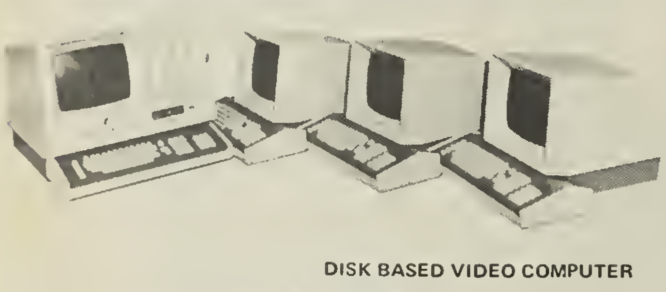

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Helping a Fast World Move Faster

No 'Revolution' Yet – DP Doesn't Touch Daily Lives

BOSTON – "The real 'computer revolution' hasn't happened yet because people don't yet use computers in their daily lives," Dr. John McCarthy of the Artificial Intelligence Laboratory at Stanford University said here recently.

"When most people have home computer terminals with access to all the world's public information, it will revolutionize the way we conduct our personal business, the way we learn new skills, the way we read, the way information is published and sold, the conduct of political and other controversy and how we decide what to buy," McCarthy told a symposium.

"The technology for information utilities serving home computer terminals is already here and cheap enough and will get much cheaper, but the organizational problems of creating new public utilities are formidable," he continued.

The timeframe for the occurrence of this phenomenon will be "within 20 years and beginning with the next five," he said.

This is when we can expect "the home computer terminal [to] revolutionize the way we conduct our personal business as much as the automobile revolutionized the way we get around."

Similar to Today's Terminals

"The terminal itself will be rather like those already in use by computer programmers. airline and other reservation clerks, etc., and consist of a typewriter keyboard and a display for text and pictures," McCarthy predicted.

"The terminal will be connected by the telephone system to a time-shared computer" with access to book, magazine and newspaper files, catalogs, airline schedules and files on government and commercial information, he said.

The obvious benefits will be the instant retrieval of any document and the elimination of a flood of paper materials, he claimed.

In the first case, "since the desire to read a particular book or article is often fleeting, much more will be read if access is guaranteed and immediate," he explained.

In the second, "trees aren't cut down and air pollution doesn't result from burning the [paper goods]."

Apparent Disadvantages

The immediate apparent disadvantages would be the nonportability of the terminal, lack of subscribers because so many people are TV enthusiasts and the raising of "1984-ish possibilities," McCarthy said.

However, "the home terminal system doesn't need more than a small minority of the population as subscribers to be economical . . . and even the TV fan will be tempted."

The eventual advantages of such a home terminal will be in-depth news coverage, the disappearance of advertising which forces itself upon the reader or viewer, the possibility of frequent revisions of articles and books (with the original copy retained) and the expeditious handling of public controversy with immediate reply, he continued.

Politics to Gain

This immediacy of reply will also improve both politics and journalism, according to McCarthy, because public figures and journalists will not be able to exercise their present ability to "hit and run."

As a result, he said, "freedom of information can be made more effective. If all public information has to be kept in publicly accessible computer systems, then the information will be nationally available."

In addition, the information utility will have the effect of promoting intellectual competition, which will "make intellectual life more interesting," McCarthy said.

Problems Must Be Solved

But "between us and the home information system lie a number of problems, some in developing suitable low-cost terminals, some in the programming technology of time-sharing, some in the economics and politics of communication systems and some in the attitude of the public and government toward innovation," McCarthy said.

"The most economical system might be a specifically designed store-and-forward system configured to give fast turnaround for short messages," he suggested.

Not in Good Shape

In the computer technology arena, he said, major computer manufacturers such as IBM, Control Data Corp. and Univac are not in very good shape.

"IBM customers are organized in such a way that time-sharing is very expensive because of their interrupt structure, expensive terminal multiplexers and their dedication to the archiac half-duplex method of communication . . . and almost unchangeable operating systems.

"Smaller companies, like [Digital Equipment Corp.], are in a somewhat better position. However, none of these difficulties are permanent," McCarthy said.

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In FAA Effort to Improve Security

Westinghouse Wins Baggage-Screening System Contract

PITTSBURGH, Pa. – The Federal Aviation Administration (FAA) is in the process of awarding contracts totaling $194,000 to Westinghouse Electric Corp. here for a minicomputer-based prototype system for screening checked baggage at airports, the FAA said.

The system, controlled by a Digital Equipment Corp. LSI-11, is designed to provide automatic baggage screening and works on the principal that explosives will absorb more X-ray energy than surrounding material, the FAA spokesman said. The increased absorption rate would be sensed by the mini and signal an alarm, he added.

The system will be an advanced version of a demonstration model built to inspect hand-carried luggage and already tested at the Washington National Airport, a Westinghouse spokesman said.

The system for screening checked baggage will be more difficult to develop, according to Arthur E. Anderson, who heads the Westinghouse development effort. "It must operate at faster speeds on larger pieces of luggage," he said, adding that the system is being designed to screen bags at the rate of one per second.

The checked baggage system will require a more sophisticated computer program designed to operate at higher speed than is required for a hand-baggage system, Anderson said.

The major advantage of the system over conventional X-ray systems is that it will not have to be monitored by security personnel and is not subject to human error, according to the FAA.

The demonstration system for screening hand baggage consists of a gamma-ray source mounted within a specially constructed container that provides two narrow fan-shaped beams aimed across conveyor belts on each side of the source, Westinghouse said.

As baggage is carried along the conveyor, it passes between the gamma-ray source and detector arrays that measure the radiation passing through the baggage.

The differences between various types of baggage is compensated for by the minicomputer, and the system sounds an alarm when the radiation transmitted through a preselected area is reduced by a predetermined amount, Westinghouse said.

Guns or other explosives cannot be masked using this system, a spokesman explained, because the masking material provides even further reduction in radiation passing through the bag.

The LSI-11 monitors the system to assure that there is no deterioration in system performance.

To minimize radiation, exposure to the fan beam is restricted to the active detector areas on each side of the conveyer belts.

Source strength is also limited to the minimum value needed to provide accuracy for measuring the radiation reductions.

Privacy Group To Hold Health Record Hearings

LOS ANGELES – The Privacy Protection Study Commission will conduct hearings on the recordkeeping practices of health care providers here June 10-12 to help determine whether confidentiality safeguards should be applied to medical records.

Individuals who wish to testify should submit their views in writing no later than May 30 to the commission's executive director in Washington, D.C.

The June hearings will focus on the conditions under which disclosures of records should be made by health-care providers.

Use of medical records in nonmedical settings such as insurance, consumer-reporting, education and employment will be postponed to a later date, the commission said.

For the present, the commission wants to know what standards and customs govern the content of a medical record, how they are enforced and to what extent the content is influenced by the records' nonmedical users.

The commission is also interested in whether health care providers permit patients to inspect or be informed of the contents of their records and what consequences have resulted from permitting individuals access to their records.

The hearings will be conducted in Room 8544 of the Federal Building here, which is located at 300 North Los Angeles St.

The commission is located at 2120 L St. N.W., Washington, D.C. 20506.

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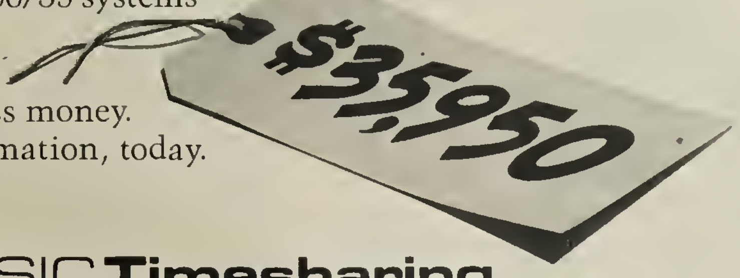

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Records Show IBM Fares Poorly in Competitive Bidding

By E. Drake Lundell Jr.

Of the CW Staff

NEW YORK – Previously secret internal IBM documents released in Federal District Court here revealed what many users already knew – IBM does not fare well in competitive situations.

At the same time, however, the documents revealed competitive bidding happens in less than half of the situations overall, and competitive bids are taken in less than 20% of the cases for the most popular computer models.

The information came from "Decision Summaries," prepared internally by the IBM Data Processing Division's Commercial Analysis Department for 1970 and 1971, but clearly indicated continuing trends.

In the figures, competitive situations were those where two or more firms bid for a single installation. Noncompetitive were those situations where the user directly contracted with a vendor without asking for other bids.

In the area of the 370/145, for example, competitive situations accounted for 16% of the decisions made by users in 1970, and IBM got 37% of these 302 orders.

The firm received 95% of the remaining 1,636 orders placed on a noncompetitive basis, giving IBM an overall rate of 86% of the business in this area for the year.

Medium Systems Area

In the medium systems area, identified as the market for 370/155s and 360/50s, users asked for bids in 12% of the 1,146 decisions made in 1970.

Out of the competitive situations, IBM got only 38% of the 133 decisions made, but it received 97% of the 1,013 noncompetitive orders placed for equipment, giving IBM 90% of the orders for the year overall.

By September of the next year, the percentage of competitive situations had increased to 27% of the total orders coming in, the figures showed, but IBM was doing better in head-to-head situations with a win rate of 64%.

In the large systems area (370/165, 360/65), users evaluated competitive equipment in only 19% of the cases and IBM won 59% of the time. However, in the area of noncompetitive bids, IBM received 94% of the business for a total share amounting to 87%.

Even a breakdown of the figures of competitive bids proves interesting in this case.

In the cases where IBM was "protecting installation," the firm won in 85% of the cases against competition, while it won in 77% of the cases where it was "protecting on-order" systems.

However, in new installations where both IBM and competitive systems were proposed, IBM won in under 50% of the cases, giving the overall 59% win average for IBM against competition.

In addition, those figures are for 1970 as a whole and the firm noted that, as of September of 1971, "IBM's head-to-head win rate [was] 36%, down from 59% in 1970."

In the intermediate systems area (370/135), IBM got 60% of the total business, even though it received only 31% of the competitive orders.

In all, there were 1,675 decisions, of which 760, or 45% were competitive in 1970.

However, in the next year, the competitive orders had fallen to 20% of the 3,008 total and IBM had increased its market share to 84% of the total decisions.

It was able to do this by getting 95% of the noncompetitive orders and 40% of the 597 competitive situations.

The increase "is largely due to Model 22 and Model 135 orders received in noncompetitive situations where IBM's decision share has increased from 82% to 95%," the planners explained.

Once again, IBM did better in situations where it was "protecting installation" or "protecting on-order," with competitive win rates of 37% and 40% respectively. In new installations with competition, the win rate fell to 28% of the cases.

50% Success Rate

A rundown of the figures showed that, in the area of very large systems (370/195), users only asked for bids 12% of the time and that IBM had a 50% success rate on these competitive bids.

However, in the 88% of the cases where there was no competitive bidding, IBM got 87% of the business. Overall, IBM racked up 82% of the orders.

In the System/3 and 360/20 area, competitive situations accounted for 21% of the total of 6,315 orders placed during the 1970 time frame.

IBM was able to get 42% of the orders in situations where there was competition, but it received 96% of the orders from firms who chose not to hold competitive bidding.

In all, IBM got 85% of the orders in this category during the year.

In the area of process control systems, there appeared to be more competitive bidding, with 72% of the decisions made on a competitive basis in 1971.

Similarly, the IBM share of this market dropped substantially in this area, where IBM got only 30% of the total orders. Where there was competition, the IBM share was 22%, but, where there was no competition, IBM received 48% of the orders.

European Banks Opt for Network

By Ivan Berenyi

Special to Computerworld

New York's Chemical Bank has decided to follow a trend among large, international merchant banks in opting for a distributed processing network to link its six main European offices.

Twin Digital Equipment Corp. PDP-11 processors will be installed in each office, one permanently on standby.

The decision reflects growing alarm among former teleprocessing users at the cost of international leased telephone lines.

Although there is no sign that clearing banks, whose major business is done via a network of branches within one country, are rebelling against telephone tariffs, the costs of international lines are now such that merchant banks can only justify their use where transactions of a large unit value are involved.

Furthermore, regional autonomy has always made more sense in Europe, where each country has its own set of banking rules and conventions that can differ considerably. A central computer system designed to handle them all requires exceptional flexibility.

The six offices of the Chemical Bank will each handle independently the sort of work that in a traditional bank computer system would have been passed down the line to the central installation. The configuration of each will be similar, but their applications software will be adapted to local conditions and capable of further modification.

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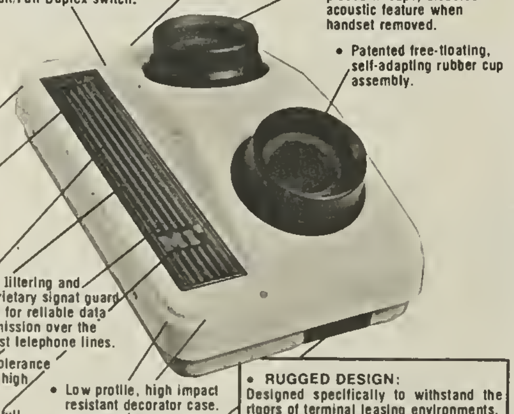
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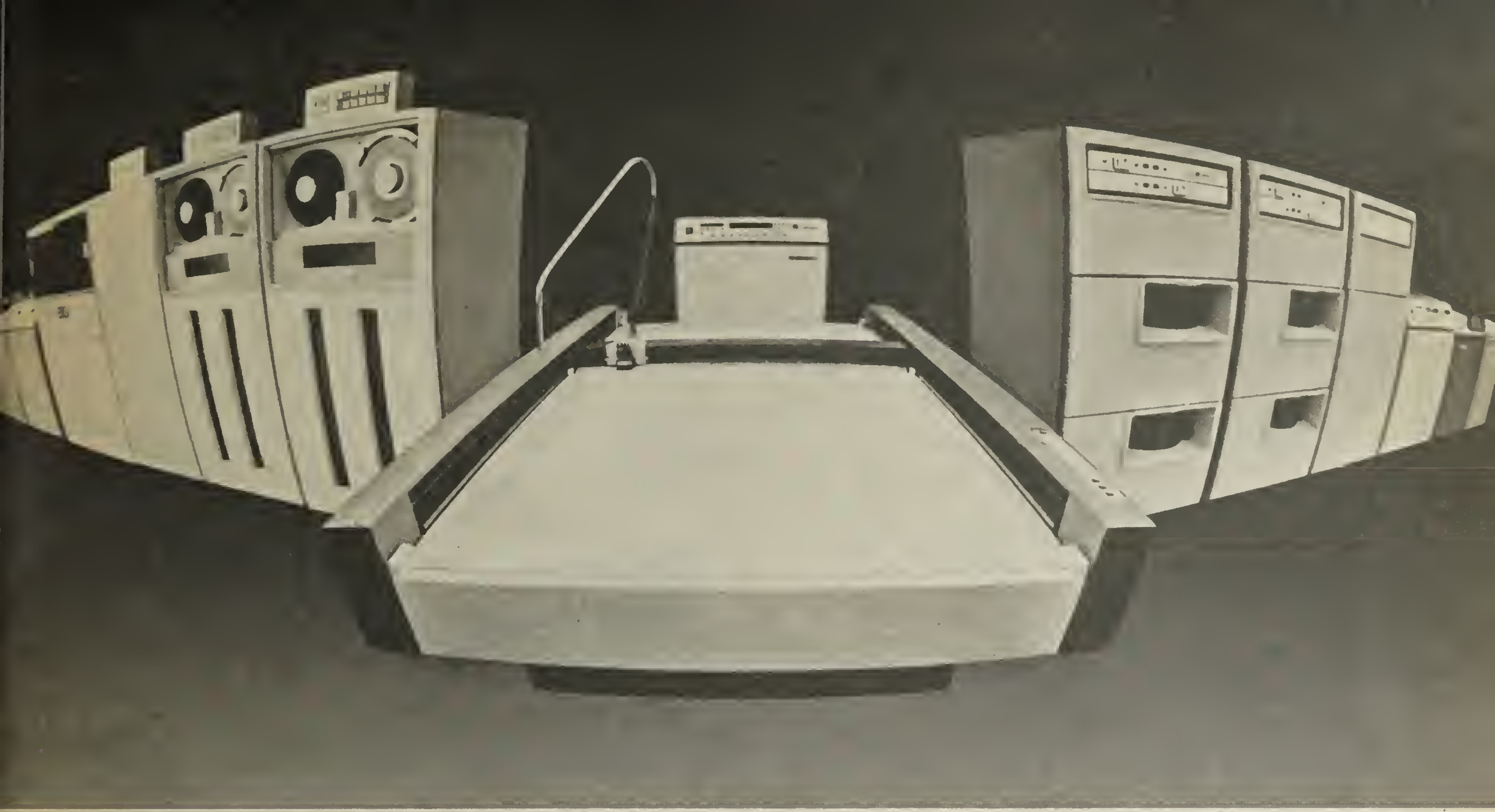

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CALCOMP

Editorial

A Warning to Users

The recent deliberate and tragic bombing of the Central Maine Power Co. (CMP) again pointed out the vulnerability of DP installations.

Fortunately the center continued operating even though two explosive devices were placed on floors above and below the computer room [CW, May 17]. The center escaped damage probably more as a stroke of luck than because of careful corporate security measures.

A day after the blasts, an FBI spokesman said there was no evidence the DP center had been the actual target. Nevertheless, officials were not sure exactly how or why those responsible entered the building. Employee identification cards were routinely required to enter the new CMP building.

The DP manager at CMP had backup facilities and files available in the event of a catastrophe. But he also admitted that physical security procedures were under review after the bombings.

It is fortunate that no lives were lost in the Maine incident. But regardless of the motives involved, it is clear that corporate DP and other security is becoming more and more important.

The days of showing off a DP center behind glass off an unrestricted lobby are gone. Users have to realize their DP installations are the nerve centers of their corporate operations.

Nobody likes seemingly redundant security measures which have to be followed day after day. But employees like a bomb-damaged facility even less. The officials at CMP thought that events like bombings don't happen to isolated Yankees in Maine. Now they know better, and it should be a warning to users everywhere.

CONTINUING LOBBYING EFFORT
?
SILENCE
CONGRESS
PRO MA BELL & FRIENDS
CON SPECIALIZED CARRIERS & USERS
CONSUMER COMMUNICATIONS 'REFORM' ACT HEARINGS
Orton
Computerworld

Letters to the Editor

Bell's Need for Bigger Profits Would Cause Phone Costs to Rise

Ma Bell's contention that permitting competition in the form of specialized carriers and forbidding Ma Bell to force a Data Access Arrangement to be used with competitive equipment would result in an increase in phone rates does not indicate competition would increase the actual cost of providing phone service [CW, May 17].

Rather, Ma Bell intends to get at least as much profit as she would without competition and therefore will find some way to raise the rates at least enough to realize the same profit as would accrue if she provided all the services and equipment.

This is very much like the attitude of the Postal Service which is talking about charging postage on data transmitted to a central computer.

I can envision the day when I carry my box of cards over to the local Cybernet office to submit my job over the counter and find in the lobby someone from the Postal Service who will weigh my cards, another from the phone company and others from United Parcel Service, Western Union, etc., each to collect his fee for transmitting my data.

There will also be someone from the Transit Authority to collect bus fare and maybe a cabbie to collect cab fare if it's discovered I have been evading such by walking.

Bret Hooper

Nashville, Tenn.

Phones to Go Way of Railroads If Government Allowed to Step In

Regarding the editorial, "Backing Bell Blindly" [CW, May 17], it is obvious *Computerworld* is knocking Bell blindly. The editorial spoke of competition; where is competition if one company is regulated and the others are not? If both are regulated, it is just a shared market.

CW seems to have all the answers in a 6-in. editorial which makes statements even the Federal Communications Commission (FCC) does not make. The FCC said the change won't hurt the telephone companies, just the customers.

What is wrong with an open debate of the issues? Look what the government did to our railroads. Maybe it will do the same to the telephones if we don't speak up.

D.G. Hamlin

Bellevue, Wash.

AT&T Losing Ground Since '64

I am concerned by the tone and "substance" of the April 12 editorial in *Computerworld*. The evidence I have seen indicates that the allegation about "the record profits being racked up year after year by AT&T and its operating companies" is totally misleading.

By consulting the AT&T annual reports for the years 1963 through 1975, I found that AT&T's net income increased over the previous year for most of that period. This was not true for 1970 and 1975, when net income declined.

However, increase in net income is not a realistic measure of economic gain; some comparative figure, such as rate of return on invested capital, is much more appropriate. Examining the statistics on this basis, it is clear that AT&T has actually been losing ground since 1964, rather than reaping unreasonable profits.

J.K. Patberg

Plainsboro, N.J.

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Data Past

Five Years Ago
June 2, 1971

WASHINGTON, D.C. – The Federal Communication Commission (FCC) approved unlimited entry of new carriers into the specialized microwave common carrier field and was expected to consider site applications from 33 separate firms planning to provide services to computer data users.

– – –

WHITE PLAINS, N.Y. – IBM cut prices across-the-board 15% on all 360 and 370 tape drives, disk drives, printers and controllers. New fixed-term lease plans of 12- and 24 months were available to users at savings of 8% and 16%, respectively.

Eight Years Ago
May 29, 1968

LOS ANGELES – Scientific Data Systems (SDS) announced the SDS 945, the third in its line of time-sharing computers. The 945 could accommodate up to 24 simultaneous users and up to 64 authorized users with a total file space of 8M characters.

– – –

WHITE PLAINS, N.Y. – IBM added three management information systems (MIS) to the repertoire of the "large" IBM 360s (Model 40s with 131K or more). Both the Information Management System (IMS) and the Customer Information Control System (CICS) were new systems; the third, the Generalized Information System (GIS), was originally scheduled for release in January 1967 but was decommitted.

The ACM Election

I write this while flying back from New York, where yesterday (May 15th) I watched the counting of ballots in the most controversial election in almost thirty years of Association for Computing Machinery history – and where I was, *mirabile dictu*, elected president for the next two years. Dan McCracken, known to just about every CW reader as a prolific and popular textbook writer and as a giver of technical seminars, and to every ACM member as a wide-ranging speaker on the humanist side, was elected vice president. Each of us, under rather different circumstances, had been refused nomination by the ACM Establishment, each of us benefited from the unsolicited support of good friends and outraged associates, each of us was nominated by petition – almost unheard of in ACM – and each of us was elected. Great show!

And that's what I propose to write about – the excitements. I'll be in immediate touch with ACM key people about substantive matters and, after I take office July 1st, with the entire membership. We will be entering a new cycle, a cycle of change. Hopefully it will be for the better, and almost certainly it will be for at least four years – a time also of major change in the computer world and the Real World. But for today, let me tell you CW people about the White Hats and the Black Hats.

The story begins with my election in 1974, by fairly normal processes, to the vice presidency. I had been a council member-at-large for some years, NCC representative, worker on the finance and standards committees, and so on. I was one of the few charter members of the Association, and had been active one way or another for virtually the entire three decades. On the other hand, I had been fairly loud in my dissatisfaction with the dominance of a small group of members. Initially they had been math professors and numerical analysts, later, when the name and specialism became accepted, "computer science" people. Some were very esoteric indeed, others had a good eye for power and advantage; all, without exception, were Establishment – and as I said in a recent column, Highbrow rather than Human.

Difficulties in the Executive Suite were immediate. Jean Sammet, the president, was at least as abrasive as I, and without my humor. And she is a workaholic: not even microscopic pebbles went unturned; not a financial fruit fly, let alone a sparrow, fell unnoted. I, on the other hand, have never been addicted. And most of the projects that merited effort I disagreed with, notably the proliferation of unreadable academic publications. So, at the end of the two-year period, it was not surprising that the nominating committee, headed by Tony Ralston, Jean's predecessor, refused to put me up for president.

Where they made their first blunder was in not discussing it with me. For several reasons, not least my plan to relocate to California, I would probably have refused nomination. Certainly I would have done so if I had been offered another shot at a council seat, as was the incumbent secretary when he decided against running for that office a third time.

The second Black Hat mistake was in turning away the supporters for McCracken for a vice presidential nomination. A clear choice between a gentle, hard-working non-Establishment candidate and a strong Establishment one would have been salutary: they were afraid to risk it. White Hat committees sprang up like dragon's teeth; in no time at all, each of us had been nominated.

The Establishment must have realized from the start that Dan would be elected. Their only hope of avoiding at least four years of lessened control lay in defeating me. That would give them a two-year breather to work against Dan, and a precedent for rejecting petition-nominated presidential candidates.

So a two-pronged strategy was mounted. On the one hand, complete silence – unbenign neglect – about the unorthodox scrimmages upstairs was offered the general membership. On the other hand, highly unusual letter-writing and telephone campaigns directed at influential members (chapter chairmen, committee heads, and so forth) were quietly begun. And at this point the Sammet/Ralston forces made a third slip: they backed the wrong horse! The letters urged a vote for Carl Hammer, and not for Peter Denning, the younger and more academic of the two nominating committee candidates. The point, of course, was to concentrate the Establishment and the anti-Grosch votes. But, putting aside unresolvable questions about backlash, the tactic was faulty; instead of Hammer and Denning splitting the conservative vote, Hammer and I probably split the Old Fogy vote! Anyhow, the result was Hammer 2146; Denning 3134, Grosch 3756 (the total, 9070 including blanks, was the highest vote, by a considerable margin, in ACM history).

Also, before the end, breaking a written explicit agreement to keep the battle "out of the papers," a long and argumentative editorial about election issues appeared in the ACM *Communications*, thereby making it possible for me to reply in this column. I had until then been very careful not to use it for personal ACM advantage during my vice presidency and during the campaign – something the Establishment had been nervous about since early 1974. Whether I helped myself is not certain, but on balance it was probably a fourth Black Hat blunder.

Anyhow, I have two things to be grateful for this morning: the dour grip of the Establishment on thirty thousand ACM members has been weakened – and I can have fun telling about it in *Computerworld*.

Herb Grosch

An Analysis of Three Alibis

Agencies' Objections to GAO Report Full of Holes

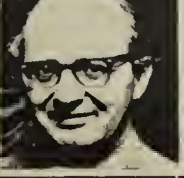
The report seemed clear enough when it went to the president of the U.S. Senate and speaker of the House of Representatives, themselves elected representatives of the people.

"Many federal agencies use computers to initiate actions that are not reviewed by people." This was the start of the cover letter from Elmer B. Staats, the U.S. controller general, reporting the problems [CW, May 17].

The Taylor Report

By

Alan Taylor, CDP



To underline where the emphasis was – reviewing what computer systems had already initiated and perhaps performed – was Staats' comment that the study had been made pursuant to the Accounting and Auditing Act of 1950 and the Budget and Accounting Act of 1921.

To anyone reading the letter, never mind the report, it was clear that the wholesale payments of funds and other vital decision making being made without later human review was at the heart of the General Accounting Office's (GAO) concern. Not mistakes occurring, but mistakes persisting when they should have been previously recognized.

This was underlined by the recommendations, which called for two specific actions:

- That internal auditors, "to carry out their responsibilities," participate actively in the design, test and review of Automated Decision Making Applications (or Admas to quote the latest barbarism that Washington has wished upon us).
- That periodic testing after implementation of decisions be both initiated, reported on and monitored outside the responsible agency.

Well, those two ideas seem reasonable enough when faced with the $25 billion/year involved and the many errors that were reported. The insinuation that the agency internal auditors had not been fully carrying out their duties and that the agencies hadn't been doing a good job either was clear enough, so I turned to the agency reviews of the report to see what they had to say in their own defense.

There were three major printed reviews, those from the Department of Health, Education and Welfare (HEW), the General Services Administration (GSA) and the Department of Defense (DOD).

After a bit of reading I became interested in the way each had constructed its response. DOD, for instance, wanted to eliminate the concept of anyone outside the agency being able to routinely monitor what was going on regarding these unreviewed decisions.

DOD did not, however, address this issue directly. Instead it raised a potentially valid argument about the General Services Administration's charter: "*We interpret GSA's charter in the ADP field to address procurement of ADP equipment, supplies and services. Your report is aimed at a different arena.*" This was the only justification DOD gave for not wanting the agency reporting to an outside, independent body.

Now, this is nonsense. If GSA is not the correct body then, unless there is no correct body, the recommendation of outside reporting is still valid. If, in fact, it is the group to monitor the operation that DOD objects to, then that, or the need to set up such a group, is the only change that can be based upon such an objection.

The charter question certainly evades entirely whether DOD should be trusted to see that public money is properly given out without independent review.

GAO Support?

Moreover, in DOD's evasion and its attempt to downgrade the GAO report (to a study and a wishy-washy set of "shoulds" instead of being a formal report calling a set of "requirements"), this alibi did much to support the argument for outside monitoring. Certainly nothing in the DOD response gave any reason outside monitoring is not needed.

The GSA was perhaps in a different position since it is the potential candidate for watching over the other agencies. Sure enough, it "strongly agrees with the following GAO-recommended solutions. . .preimplementation and postimplementation audits by independent groups."

Despite this, however, it quietly changed both of the other two recommendations it favors (cyclical system monitoring and joint system design by users and DP systems analysis) to eliminate the role of the independent, internal auditor. This independent role was, of course, a major GAO recommendation.

No Reason Given

Like DOD, GSA gave no reason for eliminating the auditor role

(Continued on Page 20)

Independence of DP Auditors Poses No Threat to DP

Reader Commentary

By Marianne Marino

Special to Computerworld

The April editorial in *Thruput*, the journal of the Association of Computer Programmers and Analysts (Acpa) revealed a basic misunderstanding about the DP audit profession which led me to wonder whether such a view is generally prevalent in the data processing community.

The editorial suggested that DPers were in danger of losing control of and responsibility for the future of the DP industry, should DP auditors "begin to certify computer installations, the adequacy of computer systems designs, the adequacy of program and system controls, adherence to comprehensive standards and the completeness of project documentation."

In conclusion, the editorial promised that future issues of *Thruput* would examine "the areas where [DP auditors] have been successful and the steps we [Acpa/DP] might take to halt this encroachment into our own field."

The misunderstanding, as I see it, centered on the premise that if auditing/accounting organizations such as the American Institute of Certified Public Accountants (AICPA) set "the pace in standards development and the auditing of computer application systems," then DP people "may find that areas which have been our province. . .have been taken over by the auditors and accountants." Nothing could be farther from the truth.

The DP auditor is first and foremost an auditor, albeit one who specializes in data processing. Within the organizational hierarchy, the auditing profession is and will continue to be a staff function – an aid or service to management.

As such, the auditor offers suggestions or recommendations to the recipient(s) of the audit report, namely, the auditee(s) and his managers. This is the extent of the auditor's authority. The authority required to implement or enforce a recommendation belongs only to management; therefore, it is difficult to see how the auditing profession could gain control of the data processing industry.

Independence a Must

The essence of the auditor's effectiveness is his independence. In order to maintain that independence, the auditor must be continually vigilant lest he cross the fine line between the "doers" and the "reviewers."

Once the auditor begins to perform the function he has previously assessed, he ceases to function as an auditor. That it is a fine line, there is no doubt.

Witness the many opinions, both auditing and data processing, regarding the extent of the DP auditor's participation in the development of a new system – i.e., should he be a full-time member of the project team or merely review project development at designated milestones?

Management relies on the auditor's independence for objective confirmation of the line staff's status reports. In most organizations of any size, management is substantially removed from the day-to-day functioning of its various departments. Particularly in technical areas, top management may lack a working knowledge of the intricacies involved in maintaining a valid, timely and efficient operation.

Thus managers lean ever more heavily on support staff to supply accurate, unbiased data for the decision-making process. This information does not supplant, but rather complements the data received from the operations staff.

Hopefully, the auditor, whether DP or otherwise, is appreciative of the viewpoints of both operations and management.

Should the auditor cross the line and begin to implement data processing policies and procedures, he would lose his value to management as a third-party data source. He would become, in effect, a data processor, and management would have to look elsewhere for its third-party opinions.

On the other hand, the fulfillment of the auditor's responsibility to management may require that he try to impose some semblance of order and control where such is lacking.

Thus professional organizations like the AICPA may propose the development of uniform standards and procedures to guide auditors in the conduct of their duties. But whether these standards and procedures are directed to the audit function itself or through the auditor to the data processing community, they are never imposed by the auditor. Only management has that authority.

If the DP audit profession has been "successful," as the *Thruput* editorial purported, it is only because management has found something of value in its recommendations. But that is hardly cause for weeping and gnashing of teeth on the part of DP (or is it Acpa?).

Evaluation Function

Performance evaluation which is the *raison d'etre* of a support function dates back to man's earliest instincts, being the very foundation of progress.

Historical data demonstrates that the "performer" has never been in danger of being relegated to the level of "draftsmen," rather than "engineers or designers" as Acpa fears, simply because his performance is evaluated. (One might be subject to termination or transfer, but that is another question).

Constructive Criticism

When performance is less than acceptable, it is the auditor's responsibility not merely to criticize, but to offer constructive solutions as well. The development of appropriate standards and procedures might be one approach. If indeed data processing has been "less than successful" in this area, as Acpa asserted, the DP audit profession would be among the first to encourage DP's assumption of this responsibility.

In conclusion, viewing the DP auditor as a competitor for the DP apple, if one eixts, is both incongruous and unproductive. The ability to recognize one's weaknesses as well as one's strengths is a sign of maturity.

Data processing has made significant strides toward the elimination of its "growing pains." Apparently Acpa would rather it eliminated "the competition."

Marino operates EDP Audit Services in West Hartford, Conn.

Federal Agencies' Alibis Full of Holes

(Continued from Page 19)

from system design or cyclical reviews. Nor did it give any detailed reason as to why monitoring of agencies should be performed indirectly and voluntarily by the Office of Management and Budget (OMB) and GSA rather than being handled as a specific duty.

GSA did say its recommendation was based on the fact that "Admas are part of the broader universe of information systems development," but it didn't attempt to tie this to the reason.

I don't blame them. The whole point of the GAO reporting is reviewing, and it is not concerned with system development. The GSA alibi fell flat on its face by confusing the two.

Facing the Issues

HEW weighed in with the longest comment, some seven pages of it. Like GSA, HEW seemed to think review matters were development matters. At least, however, the writer came out and expressed his convictions here: "We would, however, place a greater emphasis than made by GAO on. . .the design and test stages rather than. . .the operational stage." HEW didn't give any rationale as to how correcting design and test faults eliminates the need for operational reviews, which is the subject of the whole report. But at least HEW said it, and said it clearly.

HEW's objection to independent reviewers also was not as badly disguised as those of the other agencies. It agreed with this recommendation and commented that: "Most importantly, the policy and guidelines should establish criteria for independent reviews."

However, nothing more was mentioned about from where this independence is to come. GAO's points about internal auditors and outside monitoring were all ignored in the HEW recommendations, as though they had never been written.

Instead it talked about development matters and only suggested someone "issue guidelines for management. . .including recommended practices and criteria for cost-effective. . .review and monitoring. . .by independent groups."

Well, HEW certainly had the best alibi, but it didn't address why we haven't had reviews in the past and why the agencies don't want independent reviews in the future, which is a pity because we would like to know.

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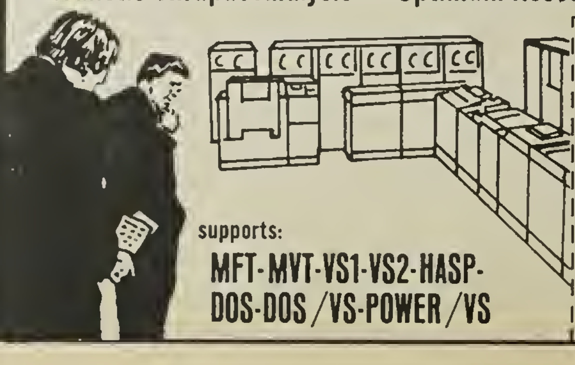

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Welcome Mat Out at X3J1

WASHINGTON, D.C. – The PL/I committee of the American National Standards Institute, X3J1, has completed its work on the full ANS PL/I (which is now in the final approval process) and turned its attention to the requirements for standard subsets.

At a meeting here last month, the committee began drafting a "Scope and Program of Work" for two levels of the subset. One is for general-purpose use and the other will serve as a base for extensions appropriate to the real-time/process-control/communications environment, according to X3J1 Chairwoman Lois Frampton.

The committee welcomes the participation of parties interested in either of the above types of subset or in others which may be thought desirable, she added.

The next two meetings of X3J1 are scheduled for July 12-14, in Carmel Calif. and Aug. 25-27 in Boston.

Those interested in attending should contact Frampton at 5-5/E40, Digital Equipment Corp., 146 Main St., Maynard, Mass. 01734 or the local arrangements organizer for the Carmel meeting, D. Beech at M77/034, IBM Corp., 1501 California Ave., Palo Alto, Calif. 94304.

DOS Users Going to 370, VS and Non-IBM Software

By Don Leavitt
Of the CW Staff

MINNEAPOLIS – Installations operating under DOS are getting bigger, moving to IBM 370s and buying at least some software from non-IBM sources, according to the findings of a survey recently conducted by the Minnesota DOS Users Group.

Taken overall, those results aren't surprising, group president Chester L. Adkins said. But, he added, "one interesting fact is that the average 360/30 size is 106K bytes. By definition then, the average 360/30 in our sample uses non-IBM memory."

Continuing his mathematical analysis, Adkins said the average 360/40 is now 225K while the average 50 is nearly 435K bytes. He noted that each model tended on the average to be twice as large as the preceding one.

This year there were 145 responses to about 250 questionnaires mailed to installations across the country in January. The majority of replies – 84, or 60% – came from 370 shops, while 58, or 40%, said they use 360 gear.

Two responses came from IBM 3 users who are members of the group even though they can't use DOS or DOS/VS.

On another topic, the majority of the respondents said they use at least one non-IBM software package, including – for seven sites – Extended DOS (Edos) from the Computer Software Co. as the supervisor in place of IBM's control system. Only 42 sites reported they use no non-IBM software.

At the other extreme, 77 shops reported use of at least two independent packages. Seventeen of the users – nearly 20% of the total – have acquired half a dozen or more packages from non-IBM sources, the survey showed.

The installations that have gone to the 370 have generally converted to virtual storage environments as well; only four users reported sticking with "straight" DOS on these mainframes, Adkins said.

At least 45 of those who have gone to DOS/VS have configured their systems with five partitions, one of the advantages this operating system has over DOS, which can manage a maximum of three partitions.

The Minnesota DOS Users Group started in the late 1960s to support local users working with DOS/360. Now it has a nationwide mailing list.

Adkins is executive vice-president, Integrated Data Processing, Inc., Suite 111, 8120 Penn Ave. S., Bloomington, Minn. 55431.

'Cosy' Generates Cobol Code From Decision Table Entries

NEW YORK – Fifty percent savings in coding and testing time, on the one hand, and "100% complete, fully structured Cobol," on the other, are the claims made for the Cobol Optimizing System (Cosy) by the vendor, C-S Computer Systems, Inc.

Developed for IBM DOS, OS and VS environments, the program generator has the ability to work from a free-form input language, from systems analyst's specifications keypunched into a predefined coding sheet or from decision tables, C-S said.

The input may be a mixture of Cosy statements and conventional Cobol source code. Statements that are already Cobol are passed through to the output file, the vendor noted. Cosy also allows the use of COPY facilities for both Cobol and Cosy routines from libraries, C-S added.

The decision table approach takes a little getting used to, the spokesman said, but has the added ability of determining that all logical paths are covered or that the user has a chance to supplement his initial input to cover all the alternatives.

Within the Cobol source code it generates, Cosy supports IBM's Vsam files, matching of up to nine files on nine different control fields and rolling of totals at control level breaks. Chained files such as those used by IBM's Dbomp and explicit addressing are also supported, the vendor said.

Created in Germany, the generator also supports a provision for stating a condition at any level so that if it is not true "the program automatically proceeds to the next equivalent level – without further instructions," C-S said.

In addition to producing Cobol source code, Cosy has the capability of producing data and application logic flow charts which could be useful both for debugging during program development and for maintenance work once the program is in production, the spokesman added.

Cosy is available now for a perpetual license fee of $18,500 or for rent at $1,500/mo, C-S said from 116 John St., New York, N.Y. 10038.

Honeywell Eases Conversions From 200/2000s to Series 60

WALTHAM, Mass. – "Smooth transition from . . . 200/2000 to Series 60/ Level 66 large computer systems without expensive program and file changes [is] facilitated by a hardware/software conversion package," CM 66, according to a recent Honeywell announcement.

Hardware and firmware components of the Compatibility Mode on the Level 66 package can be connected to any standard Level 66 configuration, Honeywell said. CM 66 enables users to run unmodified OS/2000 and Mod 1 programs and data on the newer machines, the spokesman added.

Everything But I/O

The system handles all 200/2000 instructions except I/O instructions which are executed through Level 66 hardware, he said, while the processor interface adapter of the microprocessor built into CM 66 accesses the standard Level 66 MOS memory

CM 66 does not require the Level 66 mainframe to be dedicated to compatibility. On the contrary, "other Gcos operating system dimensions, such as time-sharing, batch, remote job entry and transaction processing," can be handled right along with the work from the 200/2000.

Conversion to Level 66 native mode of operations, therefore, may be spaced out over time, in accordance with the availability and improved skills of the upgrading user's DP staff, the spokesman noted.

In any case, he added, CM 66 is to become available sometime this quarter on a one-year lease arrangement for $1,395/mo. Honeywell's inquiries center is at 200 Smith St., Waltham, Mass. 02154.

'DYL—260' Gains Freeze Option

ENCINO, Calif. – Release 3.0 of DYL-260, the report writer/data management system from Dylakor Software Systems, Inc., includes a "freeze option" which enables users to store compiled DYL-260 programs in object module format, according to the vendor.

Prior to the availability of this option, users could only work with DYL-260 in load-and-go operations. Now they can reuse code previously developed and checked out while introducing runtime variables to shape the program to production needs, a spokesman explained.

As an extension of the freeze option, users may also store DYL-260 Job Control Language (JCL) and runtime parameters on disk so only card data need come directly from the reader. Used to its fullest, the option should reduce runtimes and core storage, the firm said.

A "Data Name/Initialization" feature simplifies both field definition and data base linkages, the spokeswoman said. In previous releases, users had to work with fields defined by their relative positions in records and their lengths, but not by descriptive names, she added.

An "extended error analysis" feature monitors runtime problems and traces them back to the source statement being executed. Data areas, registers, current records and "all pertinent data" is formatted and displayed to reduce debugging time, Dylakor said.

Other enhancements include support for multiple inputs of a tape file dynamically specified; an extended parameter list capability for external subroutines; ASA carriage control for report generation; and stacker selection for card output.

DYL-260 is available for $8,000 purchase or $98/mo on lease. Discounts are offered on long-term leases, the firm said from 16255 Ventura Blvd., Encino, Calif. 91436.

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'Aide' Backs Transactions

DALLAS – The Advanced Interactive Data Entry Transaction Processing System (Aide/TPS) now available from Interactive Systems Technology (IST) is a general-purpose, minicomputer-based data entry system which provides data entry applications or terminal system emulation, according to IST.

The software runs on "any" Data General mapped mini and supports a multitasking foreground/background control structure.

Applications programs in batch mode are executed independently in the background while multiterminal interactive data entry and data base inquiry or update operate concurrently in the foreground, IST said..

Background programs may be written in any available language including Fortran, Algol, RPG, Cobol and Assembler. Control functions supported include Message Send, Broadcast, Text Editor and CLI Execute – which allows the Data General Command Line Interpreter (CLI) to be scheduled as a job to process normal CLI command streams entered from any terminal.

Aide/TPS comes with the Aide Format Control System, which reportedly includes a runtime library of format control, data entry and data formatting routines, a module containing Macro definitions for generating data entry formats, data formatting specifications and device control tables.

In addition, Aideform, a utility program, provides facilities to design, test and edit format definitions and automatically generate the descriptor language macros, eliminating the coding of formats, IST said.

Aide/TPS is available under license for $7,500 from IST at 4450 Sigma, Suite 135, Dallas, Texas 75240.

'TFM' Watches Tape Libraries, Lists Files by Volumes, Names

WOODLAND HILLS, Calif. – Tape File Management (TFM), a tape library system from Case, Wachter & Associates, Inc. (CWA), produces reports to ensure data security and provide inventory management of tape libraries for OS, VS and OS/DSO users, according to CWA.

TFM provides a report of active tapes cross-referenced by both volume serial number and data set name. Other reports include a list of tapes to be scratched, a scratch pool list, data on tapes to be cleaned and reports on usage by system, department or client as well as the necessary diagnostic edit-checking features, CWA said.

Developed during a DOS to OS conversion, TFM was designed to solve many of the tape management problems inherent with OS, keeping in mind that DOS and noncataloged tapes may need to be accounted for and maintained in a single library, the vendor said.

Because of the data set structure used for TFM and the manner in which the system was designed, several features constantly monitor and ensure data integrity and provide audit trails of all activity, CWA noted.

Tracing a scratched tape even after the retention period has expired in order to reinstate it into the active library can easily be done, for example, up until the time that tape is physically written over, a spokesman claimed.

Using IBM 2314, 3330 or 3340 disks, TFM runs in a 110K batch partition and minimizes the space needed for the tape library catalog, the firm said.

The system is available for $3,000 from CWA at Suite 243, 21243 Ventura Blvd., Woodland Hills, Calif. 91364.

'Comput-A-Charge' Set for HIS Users

CHERRY HILL, N.J. – Comput-A-Charge, the job-accounting and chargeback system from Value Computing Inc. (VCI), has been adapted for use on Honeywell Information Systems, Inc. (HIS) mainframes under either OS/2000 or Gcos, VCI said, adding both versions are available now.

The package provides a resource accounting and billing system to aid users in controlling the operational environment. Taking data directly from a log produced by the operating system, it produces a series of seven daily reports including graphs, VCI said.

The daily output shows shift activity, idle time and hardware usage. Comput-A-Charge also builds a year-to-date file from which weekly, monthly and yearly reports can be drawn, the vendor added.

Comput-A-Charge is said to provide a flexible algorithm for billing users. It can accommodate nonmachine resources, including the ability to account for and bill the costs of off-line functions such as systems analysis, programming, data entry and distribution, the vendor said.

The implementation for installations under Honeywell OS/2000 (releases 2.3 or 3.10) is available under license for $6,000. The Gcos version costs $9,000, the firm added from 300 VCI Building, West Marlton Pike, Cherry Hill, N.H. 08002.

Process Controller Gains Macro Assembler, Loader

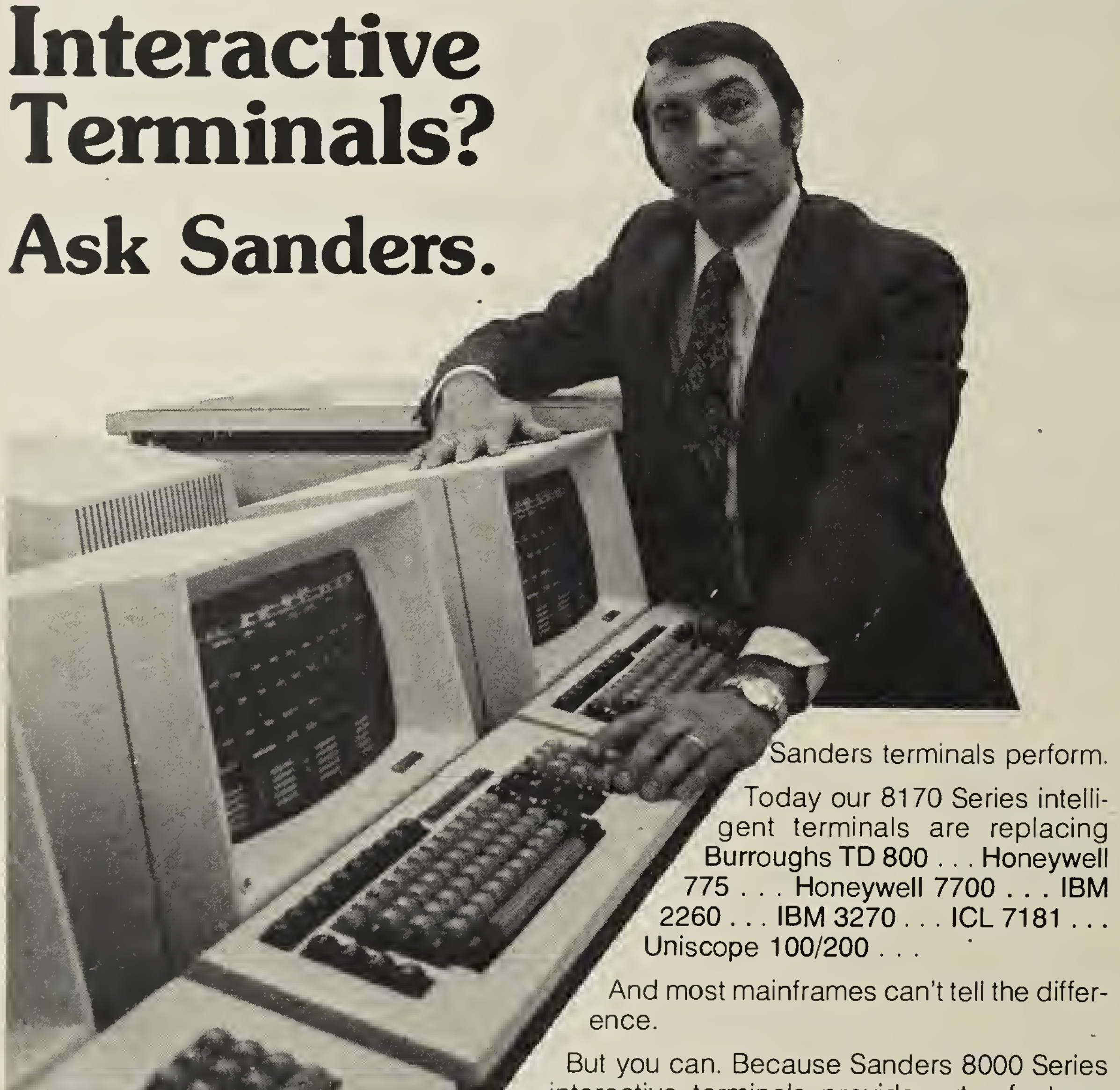
FLINT, Mich. – MAS-80R, a relocatable macro assembler, and RLL-80, a reloacting linking loader, are now available from Process Computer Systems, Inc. (PCS) for use on the firm's Micropac 80 microcomputer.

The software can combine separately assembled subprograms into a single functioning program, a spokesman said.

The packages eliminate the need to assign an absolute address to each subprogram at assembly time; entire programs therefore do not need to be reassembled in case of a change to a single module and the entire software development process is "substantially" reduced, he added.

Support for separately assembled subprograms has other potential benefits as well, the vendor said. MAS-80R and RLL-80 permit the use of identical symbols when they are local to their segments; Only global symbols must be unique, the spokesman noted.

MAS-80R and RLL-80 are being distributed by PCS as a set for $100. The company is at 5467 Hill 23 Drive, Flint, Mich. 48507.



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*T.M. Sanders Associates, Inc.

Video-Taped Training for 'Total' Extended to Include Release 7

MIAMI, Fla. – Eastern Airlines has updated the video-based training course it developed and now markets on the Total data base management system (DBMS) from Cincom Systems, Inc. to include three modules on Total Release 7, the current DOS implementation of the DBMS.

The course consists of 12 modules, each directed to a specific audience – DP management, systems analysts, programmers or others having a general interest in DBMS. It covers both the functions and use of all current IBM-oriented versions of Total.

The video-taped lessons range in viewing time from eight to 22 minutes, and actual Cobol programs are used whenever possible to illustrate specific points, an airline spokesman added.

The complete course, including the 12 modules and two copies of a reference manual, is available under license for $1,500. For users who already have the first nine modules or who require only training on Total 7, Modules 10 through 12 will be made available for a fee of $500, Eastern said.

All modules can be delivered in either cassettes or reel-to-reel 1/2-in. E1A-J1 format at no additional cost.

Marketing of the course is handled by Data Processing Sales, Eastern Airlines, Miami International Airport, Miami, Fla. 33148.

'Snapshot' of 3270 Screens

WHITE PLAINS, N.Y. – The IMS 3270 Local Copy program now available from IBM supports dynamic requests for hard-copy printout of screen displays on 3270 units attached locally to a large-scale IBM 370 mainframe.

Use of this Installed User Program (IUP), developed by Hamilton Standard Division, United Technologies Corp., is triggered by an operator entry at the 3277 keyboard. Once the program is invoked, an image of the screen display – input or output – is queued to the designated 3284 or 3286 printer.

Previously, local hard copy was obtained by including code in the application to send a duplicate of the outbound screen image to the printer.

Multiple 3270 display stations within the same line group are supported, but the buffer size of the destination printer must be equal to or larger than the buffer size of the display station to be copied, a spokesman noted.

Additional Information Management System (IMS) considerations – this program works only under IMS – include allowing at least 1,304 bytes for the long-message queue buffer and allowing an additional 3,100 bytes in the line buffer pool for each local group containing supported display stations.

IMS 3270 Local Copy supports components of the information display system which are accessed through Btam; Vtam support is not implemented in this IUP, the vendor said.

The program is written in Assembler and designed to run under IMS/VS 1.0 and 1.0.1. Testing has been done using OS/VS2 Release 1.7. The package is available under license for $190/mo, which is waived after 12 payments.

Compustat Data Base Now on Cyphernetics

ANN ARBOR, Mich. – Finance data on over 3,500 companies, expressed in more than 100 items of information about each, is included on the Compustat data base now available on the time-sharing services of Cyphernetics Division of ADP Network Services.

Developed and maintained weekly by Investor's Management Sciences, Compustat can be used to trace annual information for the past 20 years and quarterly detail for the past decade.

The data can be used to reconstruct balance sheets and income statements as well as other financial reports, Cyphernetics said.

The data itself can be accessed and analyzed through a range of programs in the Cyphernet library, including both conventional financial and time series analysis techniques and data base management systems.

Charting and more complex graphic output is also possible through Cyphernet facilities, the network said.

Cyphernet service is available in more than 40 major cities across the U.S. The network is headquartered at 175 Jackson Plaza, Ann Arbor, Mich. 48106.

Calcomp Disk Drives Monitored by 'DSO'

ANAHEIM, Calif. – A modified version of the Data Set Optimizer (DSO) package has been developed by Boole & Babbage, Inc. and is available from California Computer Products, Inc. (Calcomp) for use with Calcomp 1030 and 1035 disk storage systems on IBM 370s.

As with the package developed originally for IBM disk systems, the Calcomp DSO is designed to increase the user's control over disk volume and data organization and provides measurements of how frequently particular data sets are used, Calcomp said.

DSO generates a series of reports to document things such as location of data sets by pack, amount of movement between data set pairs and recommendations on how to regroup these data sets to gain efficiency. Regrouping may reduce head movement by 20% to 40% and minimize seek time so that throughput is "significantly reduced," the spokesman added.

Lease price for the Calcomp DSO – which can be used to monitor mixed IBM-Calcomp as well as "pure" Calcomp disk environments – is $300/mo, including maintenance. The package is available now, Calcomp said from 2411 W. LaPalme Ave., Anaheim, Calif. 92801.

Correction

Data Services Corp. of America, vendor of the Minidump package for IBM OS and OS/VS shops [CW, May 10], is at 1501 Wilson Blvd., Arlington, Va. 22209.

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Users Want Too Much From Hipo: Yourdon

Concepts and Techniques

By Edward G. Yourdon

Special to Computerworld

What's wrong with Hipo? Nothing.

Well, not very much. The major problem is the way people *use* Hipo.

But let's back up for a moment. What *is* Hipo?

It is a documentation technique developed by IBM to illustrate the hierarchy and structure of a large program or system. With the advent of structured design and programming, Hipo has received a great deal of attention. See, for example, "Hipo for Developing Specifications" by Martha Nyvall Jones in the March 1976 *Datamation.*

For more details on Hipo, which stands for "Hierarchy, plus Input, Process, Output," see the IBM manual *Hipo: A Design Aid and Documentation Technique*, Form GC20-1851-0.

Figure 1 shows a typical "hierarchy chart." Figure 2 shows a "detailed Hipo," or "functional Hipo," or "input-process-output diagram" for a single module.

And Figure 3 shows an alternative diagramming technqiue: a "structure chart," drawn according to the guidelines in *Structured Design* by Larry Constantine and myself. And there are other variations, too.

Hipo has some definite virtues. It represents a significant improvement for organizations that previously had *no* diagramming techniques with which to represent the architecture of their systems – i.e., Hipo is better than nothing.

Also, Hipo appeals to many managers and users (and analysts) because the hierarchy chart in Figure 1 looks like the company organization chart with which many people are familiar.

And – a point not to be ignored – Hipo has the support of IBM.

So, what's wrong with Hipo? I have only two technical complaints. First, common modules – things like a "print" module which is called from many different parts of a system – must be repeated in the hierarchy chart of Figure 1 each time it is used.

Second, the hierarchy chart in Figure 1 does not show the interfaces between modules. One must glean that information from the detailed diagram in Figure 2 or one must turn to a separate document, an "input-output table" which lists the inputs and outputs to each module.

My experience has been that the hierarchy chart in Figure 1 loses half its value if the input/output interfaces are not shown on the same diagram. The structure chart shown in Figure 3 takes longer to digest (and for that reason may not be a useful technique to show to users), but the information content is much higher.

Most of the problem, though, has to do with the misuse of Hipo.

Since people are not required to document the module interfaces on the hierarchy chart, some designers never document the interfaces at all! They select vague, ambiguous names for the modules in Figure 1 – names like "control" or "driver" or "do-it-all" instead of following the guideline of using a transitive verb and a single, nonplural object.

Also, the detailed diagram shown in Figure 1 is not kept up-to-date any more than detailed flowcharts were in "the good old days." So, while they may be useful as a design tool, they probably are *not* useful as a maintenance tool – because the maintenance programmer can't depend on their accuracy.

Perhaps the biggest problem of all, though, is that Hipo is treated as a panacea.

When I ask my students, friends and consulting clients, "Are you doing structured design in your organization?" many reply, "Sure! We're drawing Hipo diagrams like mad! You should *see* all of our Hipo diagrams! Fantastic!"

The obvious point is that drawing 10,000 Hipo diagrams does not guarantee you'll end up with a good system.

The title of IBM's manual says it all: Hipo is a design *aid* and a *documentation technique* – it's not design, in and of itself.

Yourdon is chairman of the board of Yourdon, Inc., New York, N.Y.

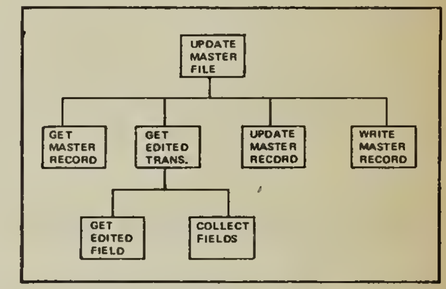

Figure 1

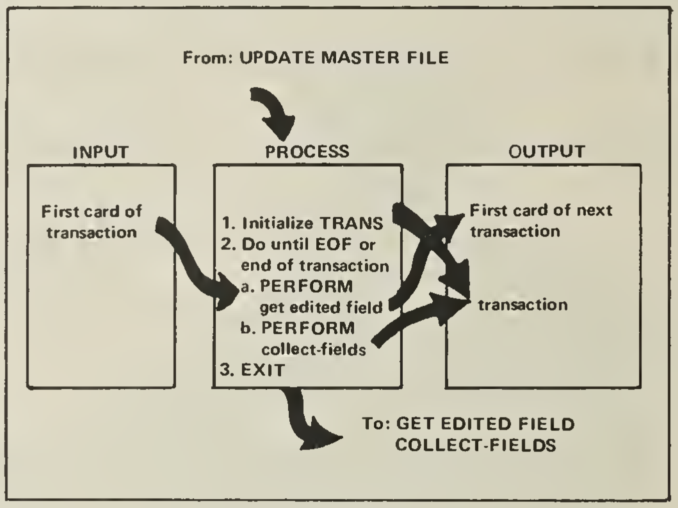
From: UPDATE MASTER FILE
INPUT
PROCESS
OUTPUT
First card of transaction
1. Initialize TRANS
2. Do until EOF or end of transaction
a. PERFORM get edited field
b. PERFORM collect-fields
3. EXIT
First card of next transaction
transaction
To: GET EDITED FIELD COLLECT-FIELDS

Figure 2

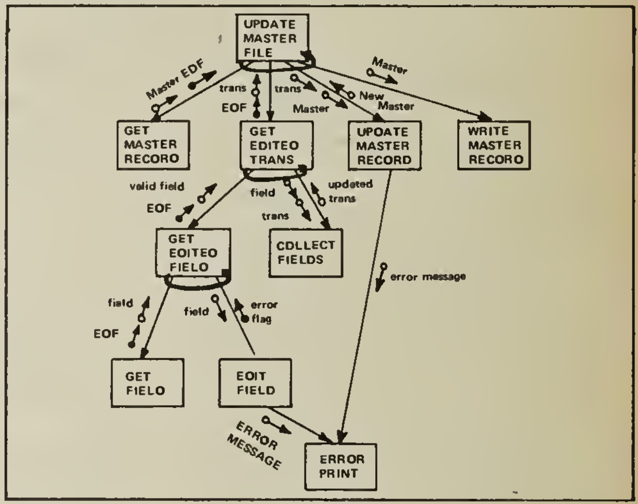

Figure 3

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Trying New Techniques With Cobol Called Hopeless

By Tom McSloy

Special to Computerworld

Concepts and Techniques

Edward G. Nilges [CW, March 22] was only the latest of many to try to apply the disciplines of structured programming to that unwieldy mastodon, Cobol. His suggestions were more sensible than most, but he failed to demonstrate that Cobol can be used to develop true structured code.

Nilges correctly criticized the absurd lengths to which programmers must go to shoehorn Cobol into more structured forms, particularly the misuse of PERFORM . . . UNTIL.

The concept of "virtually structured programming," as he outlined it, seems a sensible retreat from the hopeless attempt to blend Cobol and the Improved Programming Technologies (IPT).

Nilges included the word "structured" in his system's title as ritual obeisance to the popularity of the IPTs. What it really is, though, is simply the way good Cobol programmers have always programmed, long before they heard of Dijkstra or Harlan Mills.

His "virtually structured" example of the IF . . . THEN . . . ELSE block used to be called "cascade" logic: program flow ripples down through the code, "cascading" over sections of it, based upon the judicious use of IFs and GOTOs.

No Magic to It

The system Nilges described is altogether the best way to program in Cobol; easiest to debug, to maintain and to understand. It is much superior to faddish language constructs like PERFORM . . . UNTIL, tacked on as an afterthought to Cobol's thick hide.

After all, there is nothing magic about structured programming. Mills and others simply discovered what it was that good programmers did and developed disciplines to make it easier for all programmers to write that way.

Had Nilges' article been entitled "A Better Way to Write in Cobol," I could only have applauded. However, he seemed to be also saying that his "virtually structured programming" examples can be substituted conceptually for the main building blocks of true structured code.

His evidence for this consisted of pseudocode examples which accomplish more or less the same functions as IF . . . THEN . . . ELSE and DO WHILE – though they use GOTOs – and observations of generated object code which contains GOTOs.

Nilges missed the point.

Languages such as PL/I have, built into them, the syntactical elements necessary to write true structured code. This is not to say that unstructured PL/I programs cannot be written; to write one, however, the programmer must swim against the natural flow of the language.

In Cobol, he may at least attempt to write structured code, but in doing so, he is bucking the natural tendency of *that* language, which imposes arbitrary restraints (e.g., reserved words, and the four DIVISIONs) but is, in the main, unstructured to its very core.

The idea of structured programming is to make it easier to write readable, maintainable, relatively error-free programs. It assumes the existence of language constructs necessary to accomplish this. Most of these are absent from Cobol.

Didn't Mention Limitations

Finally, Nilges failed to mention many Cobol limitations which thwart the most well-meaning efforts to implement top-down design and structured programming in that language:

- In Cobol, all data is known globally to all code. Functional independence and isolation of data, one of the key elements in top-down design, is therefore impossible.
- Given the inadequate language support for certain common programming functions, Cobol programmers must get tricky, which seriously affects the clarity of the code. In Cobol, one must treat strings as single-character arrays, for example, if one wishes to isolate substrings within them.

Another example involves having to code something like this:

```
02 HALFWORD PIC S9(4) COMP VALUE
   +128.
02 FILLER REDEFINES HALFWORD.
   03 FILLER PIC X.
   03 HEX-80 PIC X.
```

before a field can be tested for a hex "80."

- The absence of POINTER variables and of the ADDR function makes Cobol very cumbersome in on-line, real-time or data base systems where the actual location of data is not known until execution time.
- It is often difficult to isolate data paths among Cobol modules not only because of globally known data, but because there is no support in Cobol for parameter passing between, say, SECTIONs of a Cobol program, as can be done between PL/I internal procedures.
- The lack of such disciplined constructs as IF . . . THEN DO . . . ELSE DO and Cobol's sensitivity to periods creates bugs which look perfectly logical at a glance.

This is a violation of the bug-free objectives of structured programming, particularly when one considers that not all such bugs will be caught by the compiler, as in the following example:

```
IF condition-1
   THEN
      MOVE A TO B.
      ADD X TO Y.
      COMPUTE SQRT=SQRT**2
```

Do you see the bugs? Probably not right away. A common error in Cobol is to put periods after statements within IF . . . THEN blocks, where they don't belong.

It is possible to have bugs in any language, of course, but Cobol makes it easy to make such mistakes. The same logic, written in PL/I, could not contain this sort of error because of PL/I's syntactic discipline:

```
IF condition-1
   THEN DO;
      B=A;
      Y=Y+X;
      SQRT=X**2;
   END;
```

- The lack of a Cobol macro processor to add user-written verbs or to enforce installation standards is widely recognized. PL/I, of course, has this facility built into the language, though its implementation could be improved.

McSloy is an independent consultant with McSloy & Associates, Chicago.

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By Jim Harder
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Remedies Exist for 'Dehumanized' Training Program

By Jack L. Stone
And Alexander P. Grant
Special to Computerworld

Humanization of the work place should be a major objective of computer center managers at all levels.

This requires, among other things, that management demonstrate a sincere interest in the personal development of computer center people. One significant area in which management can demonstrate such interest is the training process.

However, most computer center managers report that training programs, where they exist at all, are largely ad hoc efforts implemented on a crash basis to meet a crisis need.

Also, primary in-house training capabilities are frequently confined to standalone audio/visual packages despite the general acknowledgement that they are not effective unless supported by an experienced instructor.

Another problem is that personnel are often required to attend training courses entirely or partly on their own time; i.e., workloads are not adjusted to provide adequate time for training.

The amount of training offered computer center personnel seldom exceeds one or two days a year. In most installations, an average of 10 days of formal training per year per person would be more cost-effective.

Peopleware

One important element of a sensible, cost-effective, long-range personnel development program is carefully planned, continuing training based on the needs and aspirations of the people acting as thinking beings rather than as interchangeable parts of a machine system.

Until humanistic management prevails, personnel motivation, initiative and productivity will continue at unsatisfactory levels.

Computer center managers should not complacently think that personnel relations are in good shape because of the low turnover rates that have become common in recent years. It is more likely that the economic recession rather than newly found love for management and organization is the causative factor in low personnel turnover.

Moreover, personnel frustration levels have increased during the past several years. If this is true, we may reasonably expect a rapid increase in turnover as the economy improves.

Minimizing Turnover Possible

However, we believe managers can minimize this projected trend and maintain or increase productivity. One of the approaches for production people useful in attaining such objectives is to use a live instructor to conduct training courses.

For most people, learning from "machines" alone, whether programmed instruction (PI) texts, computer-aided instruction (CAI) or audio/visual packages, is dull, tedious and unprofitable. For some, it can be dehumanizing and counterproductive.

Another approach is to support the instructor with commercially available curriculum materials. Experienced instructors can adapt such stock materials to serve the specific needs of the individual computer center.

Also, the instructor should be given time to give individual attention to students outside regular class hours. Computer center people come from a wide variety of backgrounds and, therefore, have widely varying learning capabilities and needs.

This is one in a series of articles by these authors. In this article, Stone and Grant outline specific means of "humanizing" the training process. In the next, they will discuss the possibilities of unionism in the DP environment.

Students should be required to use current hardware/software technical reference manuals during workshop sessions in class and homework assignments. This action helps overcome their initial reluctance to use the manuals.

Frequent Quizzes

It also helps to provide quizzes frequently in the classroom, but do not collect quiz grades. Let each student correct his own quiz.

Quizzes should be fairly easy in the beginning. Let the students obtain immediate success experiences early in the training program.

It is important to announce and administer written mid-course and final examinations. These examinations assist in motivating the student and establishing an acceptable level of in-class and homework performance.

Also assure that each instructor engages in extensive interactive dialogues with the students. Interactive discussion tends to promote the attitude that training is a cooperative effort by the instructor and the students.

Another training technique is to organize the students into small teams for laboratories or workshops. Assign the more experienced or capable students as team leaders. Such assignments are productive both for the team leaders who learn by teaching and for the team members.

Reviews Helpful

Conducting brief reviews at the beginning and end of each class session helps the student to "put the pieces together" and promotes retention of learning.

It also helps to emphasize concepts during classroom presentations, to build a broad understanding of systems, flows, functions and processes. This strategy is more productive, in both the short and long range, than presentation of masses of technical details.

It is also important to build interest in the student for follow-on self-development and professional growth. Establish and make known knowledge and skills requirements for desirable assignments and promotions.

Have a key manager or executive start each major training program with remarks expressing management interest in the growth and development of personnel. Have another executive present graduation certificates at the conclusion of each course.

Stone is the managing editor and Grant a senior associate of Computer Education International, Inc. of Washington, D.C.

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Includes Two Nationwide Services

ITT Switched Common Carrier Network on the Boards

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – International Telephone and Telegraph Corp. (ITT) has filed an application with the Federal Communications Commission (FCC) to offer a switched nationwide common carrier network that would serve data and other users.

The two services, slated to begin in 1978 by ITT Corporate Communication Services, Inc., will be a switched private network service (SPNS) and a corporate communications switching equipment (CCSE) offering.

Under SPNS, users will get four-wire switched facilities on a subscriber-to-subscriber basis. The SPNS user will have dedicated access lines between his location and the ITT switching center, but the facilities between switching centers will be shared with other users of the service, the company said.

Service features planned under SPNS include privacy, per-call billing and traffic data. Proposed rates for SPNS filed with the application to the FCC show a suggested local access charge of $30/mo per channel with an $85 one-time installation charge. Usage charge per port will be a minimum of $120/mo.

Beyond the minimum rate, eight categories based on distance and time the network is used will apply. These will range from 3 cent/min from 1 to 400 miles up to 39 cent/min at distances over 2,500 miles.

The SPNS offering will have 1 min minimum call time with additional time billed in 6 sec increments.

The second service, CCSE, will provide the user only with access to the switching equipment. It will require that a large user contract for the use of a minimum of 96 ports; billing will be based on a flat charge of $120/mo per port plus a one-time installation fee of $60 per port.

Under CCSE, users will have responsibility for providing the lines between switching centers; these networks will be customized in nature. Users will be able to utilize their own processors on a CCSE network, an ITT spokesman said.

Although this service will use the same switching centers as SPNS, FCC approval is not required for the CCSE offering, he said, adding ITT will be its first customer.

Seven switching centers will be constructed in New York City; Memphis, Tenn; Atlanta; Cleveland; Chicago; Dallas; and Los Angeles. Later "tariff-extension" cities will include Boston; Newark, N.J.; Philadelphia; Baltimore; Washington, D.C.; Milwaukee; Gary, Ind.; Houston; San Francisco; and San Diego.

Other ITT Services

ITT also has other specialized carrier services that include the U.S. Transmission Systems network, which recently began operations between New York and Washington, D.C. This network provides users with conventional voice-grade lines.

Another ITT subsidiary, Domestic Transmission Systems, has filed with the FCC to offer a packet-switched store-and-forward network called Com/Pak beginning operations in 1977. This plan is currently pending before the FCC.

In a related announcement, ITT World Communications announced it plans to interconnect its overseas facilities with the Graphnet specialized carrier network operated in the U.S. by Graphnet Systems, Inc., for facsimile and data users.

TRW Has 'New Generation' POS System

LOS ANGELES – Described as a "new generation" point-of-sale (POS) system, the 2001 from TRW, Inc. will reportedly make it possible for department stores to reflect their individual operating styles while increasing sales-counter efficiency.

The 2001 was designed to offer the user full interactivity and programmability, TRW said. It electronically enforces transaction policies and procedures, audits sales and collects sales information for financial and merchandising applications.

On the sales floor, for example, the acceptance of charges, checks and gift certificates can be varied by department, the firm said.

The retailer can record multiple forms of payment and combinations of payments and authorize each depending on his operating procedures.

The 2001 capabilities include displaying operator prompting and promotional messages on a programmable video display; performing complex calculations through its microprocessor-based programmable POS terminal; and communicating POS information through a real-time systems architecture, TRW said.

This architecture combines high-level software, distributed processing, modular expandability and what TRW called "selective redundancy."

The 2001 system features a 9-in. video display which rotates on a 40° axis on top of the terminal, primarily intended for operator prompting and error checking.

The display also permits inquiry and data entry capabilities in real-time applications such as big-ticket inventory, credit and check authorization. Between transactions the unit can display promotional messages informing customers of upcoming sales and sales in progress; it can also be used for security alerts, TRW noted.

Hardware for the 2001 system consists of three basic elements:

- A store-level minicomputer which supports up to 128 terminals, collects data and communicates with external data bases.
- A microprocessor-based terminal support module which provides backup for terminal support and data collection from up to 30 terminals and handles terminal support in satellite stores.
- A POS CRT terminal that offers full stand-alone capability on the sales floor. The terminal stores in memory the logic to perform complex calculations as well as tax tables, discount schedules and delivery information for lookup.

All functions of the system are software-directed, with programs written in a high-level language called PLT 1, TRW's enhanced version of PL/1.

The price of the 2001 POS terminal is $3,975. The cost of a basic backroom, store-level system including standard report and operating software starts at $48,000, according to the company. Initial deliveries are expected to begin in the third quarter.

Customer services for the system will be handled by TRW's network of service centers located throughout the U.S. and Canada.

Tran M3200 Pacuit Backs Network Builders

EL SEGUNDO, Calif. – A network management and switching system introduced by Computer Transmission Corp. (Tran) offers the combination of packet and circuit switching to builders of common carrier or private digital data networks for the first time, Tran said.

The M3200 Pacuit network management and switching system incorporates microprocessing hardware. This enables users to communicate with each other from remote terminals and with a central computer in a concurrent synchronous mode to facilitate network operation, Tran said.

The system permits the user to immediately access any available port with automatic cut-through for busy connections at the network manager's discretion, a Tran spokesman added.

It limits error requirements and supports most varieties of terminals now in use because it deals with them transparently, he said.

The M3200 Pacuit runs under a real-time operating program, the Data Switch Operating System (DSOS). Like the system hardware, DSOS is modular in structure, Tran said.

The functional and I/O facilities required by each switch in the network are defined through a system generation process which allows for a tailored version of DSOS for each switch, according to the company.

The system product line is based on the use of a bus structure that allows plug-in modules to be attached to it. Diagnostic modules can be added to the multiplexer for "extensive troubleshooting," Tran said.

The heart of the network management system is the network control center which provides real-time network monitoring, on-line network diagnostics, billing data collection and data switch down-line loading, the vendor said.

A utility mode for nontransparent network functions, a multiplexer for both synchronous and asynchronous traffic, a Teletype console support and high-speed trunk interfaces for internode connections are included, as is a port expander module for interfacing a high-speed synchronous multiplexed data stream directly to a computer, the company said.

The M3200 Pacuit carries a base price of about $50,000 for a "typical switch location" including the minicomputer, microprocessors and several interfaces, the spokesman said.

The cost, however, depends upon the complexity of the network; the system can grow from a few channels to one supporting nodes in many cities, providing several classes of service to a large number of terminal and computer resource channels in a shared-user environment, he noted.

Tran is located at 2352 Utah Ave. in El Segundo, Calif. 90245.

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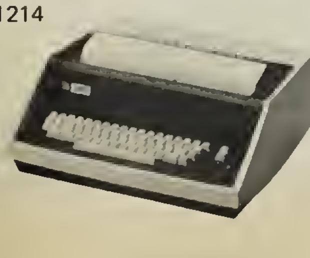

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Hand-Held Order Entry Terminal Has Micro, Communications

LOS ANGELES – A hand-held order entry terminal with communications capability for use in commercial retail applications has been brought out by Bergen Brunswig Corp.

The company's Ultraphase terminal incorporates a microcomputer module and memory pack and a series module for transmitting information after optical scanning of 6- and 12-digit Universal Product Code (UPC) labels, it said.

The 26-oz. terminal has an integrated optical probe for scanning UPC-A and UPC-E black and white or color bar codes in either direction.

It also features a LED display of the UPC plus three digits for quantities and one digit for the status code.

In addition, the Ultraphase incorporates a 16-key numeric and function English keyboard, the company said.

The microcomputer module works with two 4K-byte memory packs which can store up to 800 line items and is said to be easily upgraded to provide greater storage or added functional capabilities.

Data transmission is accomplished through a built-in acoustic coupler in the service module or through a Bell Data Access Arrangement (DAA) through an optional DAA cable, Bergen Brunswig said.

The service module transmits up to 800 lines of order entry information stored in the memory pack over voice-grade telephone lines at 1,200 bit/sec, it said.

When the probe is used to enter a product code, the code appears on the top line of the LED display. Positioning of the code number is controlled by the microprocessor, the company said.

The Ultraphase's price of $2,950 includes the microcomputer module, two 4K-byte memory packs.

Bergen Brunswig is located at 1900 Ave. of the Stars, Los Angeles, Calif. 90067.

Sanders Graphic 5 Intelligent System Capable of Remote, Local Operations

NASHUA – An intelligent interactive graphics terminal display system has been introduced by Sanders Associates, Inc.

The system reportedly is capable of being connected directly to a computer that has a standard telecommunications or terminal port and can operate in local or remote mode.

The Sanders Graphic 5 system eliminates the need for complex interface software and enables the user to concentrate on specific applications programs, the firm said.

The basic system consists of a terminal controller, 21-in. CRT display and input devices such as keyboard, light pen and trackball.

A read-only memory (ROM) in the controller contains a stored program that handles communications between the terminal and host computer, controls the data entry devices, maintains and controls the display image refresh and performs other tasks usually done in the host computer, Sanders said.

The Graphic 5 system, which features built-in self-test and diagnostics, contains an 8K-word, 16-bit refresh memory expandable to 24K words.

An optional Fortran callable graphic subroutine package (GSS-3) enables applications programs to be written in Fortran, Sanders noted.

The system features standard serial interfaces that are plug-to-plug compatible with host communication ports. A generalized parallel interface is available for local installations.

The Graphic 5 basic system is priced at $38,700 from Sanders at Daniel Webster Highway South, Nashua, N.H. 03060.

CNCP Making Packet-Switched Net Compatible With CCITT's X-25

MONTREAL – The packet-switched Infoswitch network being implemented by Canadian National Canadian Pacific (CNCP) Telecommunications will be compatible with the X-25 recommendation of the Consultative Committee on International Telephone and Telegraph (CCITT).

This was one of the points brought out by F.G. Carleton, CNCP Infoswitch project manager, in a recent speech at the national conference of the Data Processing Management Association here.

For synchronous operation, Infoswitch will initially use the Higher Level Data Link Control (HDLC) subset included in the X-25 recommendation. It will also utilize a subset of Synchronous Data Link Control (SDLC) and a subset of Binary Synchronous Communications (BSC), Carleton said.

Since the final version of these protocols "is not certain, we are structuring to allow more versions each of HDLC and SDLC," he said.

Flow Control Procedure

To control the flow of data to and from the packet mode within the Infoswitch network, a flow control procedure is being implemented, he said. The X-25 recommendation includes a flow control procedure recommended by CNCP and the Trans Canada Telephone System (TCTS).

In order to allow public access from packet-switched and circuit-switched networks to existing private line nets, compatibility must be provided, Carleton noted.

This means carriers must maintain simple procedures that deal with the establishment of a connection; in this area, CNCP does not agree with the network plans of TCTS, he said.

Using the Infoswitch approach, call establishment procedures remain the same and completely flexible customer networks are feasible. Since this is not possible with the X-25 recommendation, CNCP therefore "has a major disagreement with TCTS in this area," Carleton said.

'Collisions' Countered

Another area of disagreement between CNCP and TCTS relates to the traditional carrier network functions over the customer's interface and into his equipment. The X-25 recommendation requires the customer to select a path (logical channel) to the network at call set-up request time.

Since the network selects the logical channel for incoming calls and can simultaneously select the same channel as that chosen by the user, the terminal must deal with the problem of "call collision," he said.

Call collision logic exists in all networks, but heretofore has not been required in the customer's equipment. CNCP's major interface will not have this problem, Carleton said.

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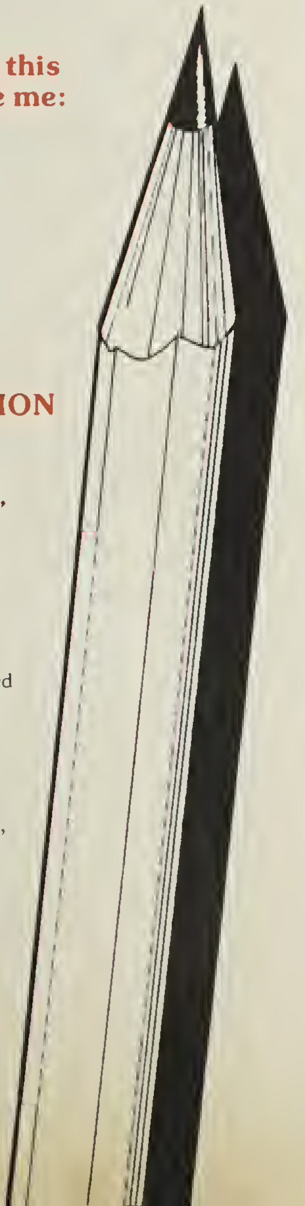

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Works With Model 279

NCR Has Bank Posting System

DAYTON, Ohio – NCR Corp. has a microcomputer-based passbook posting system which it said operates with the NCR 279 financial terminal.

The NCR 279 Passbook Posting System combines the features of the company's Model 279 terminal with another product introduction, the NCR 2564 passbook printer.

The system provides commercial banks and thrift institutions with the ability to handle passbook savings transactions and cashed check listings in an off-line mode at the teller station, NCR said.

Terminal Transactions

Later versions of the system will feature on-line processing to a CPU, a spokesman added.

Application software for the system is stored in up to 64K of random-access memory (RAM) in the NCR 2200 microcomputer, which provides in-house control for the terminals and passbook printers, the company said.

The system also includes the NCR 2501 interactive module controller with 1K of read-only memory (ROM) and 8K of RAM. The 2501 is a freestanding microprocessor-based controller which NCR said links up to four printers to the micro.

Each printer can serve up to four 279 teller terminals; the system can handle a combination of up to 24 NCR 279 terminals and interactive module controllers, NCR said.

In a typical savings deposit transaction, data is entered into the 279 terminal at the teller station. The savings passbook is then inserted into the printer and the passbook updated under the control of the microprocessor, it said.

The price of the 48K microcomputer is $10,020 or $375/mo. The interactive module controller is priced at $1,500 or $75/mo; the passbook printer sells for $3,200 or $120/mo.

Prices for the NCR 279 terminal begin at $2,600. There is a one-time software installation charge of $400 and a monthly license fee of $35.

A typical 12-teller operation costs approximately $4,500 per station on a purchase basis, NCR said.

Deliveries of the system are scheduled for the third quarter, the company added from Dayton, Ohio 45479.

Telcon Introduces Bell-Type Modems

FT. LAUDERDALE, Fla. – Telcon Industries, Inc. has developed a line of 300-, 1,200- and 2,400 bit/sec Bell-compatible modems for stand-alone, central office, rack and OEM configuration.

The modems are designed on single PC cards which can either be plugged into a stand-alone data set or into a standard Telcon TFX-20 rack, the company said.

The 1200 is also available in another version, the TDM 1200, which is plug- and software-compatible with Digital Equipment Corp's PDP-8 and PDP-11, Telcon said.

The price of the basic 1200 is $365, and the TDM 1200 is $795. The 300 costs $345 and the 2400 is also priced at $795.

Delivery is four to six weeks, Telcon said from Ft. Lauderdale, Fla. 33315.

IMR-80 Readers Enhanced

PASADENA, Calif. – Bell & Howell's Business Data Products Division has introduced a binary synchronous communications enhancement for its IMR-80 series of intelligent optical mark readers.

The communications capability permits users with IBM host computers to enter edited optical mark data using binary synchronous communications emulating remote batch terminals such as the IBM 2780.

A basic IMR-80 bisynchronous system is an integral package consisting of the IMR-80 microcomputer and its associated I/O electronics, a 300 card/min card transport, a modem control interface for switch-selectable synchronous or asynchronous communications, a control panel and a power supply.

The basic unit is available on a lease basis for as little as $322/mo from 360 Sierra Madre Villa, Pasadena, Calif. 91107.

IBM Adds POS Units

WHITE PLAINS, N.Y. – IBM has added two terminal models to its 3600 financial point-of-sale (POS) system. The terminals, designated 3606 and 3608 models 2, provide plastic-card transaction services at small retail stores.

With the terminals, financial institutions can enable retail outlets such as clothing boutiques and restaurants, which require only a single point-of-sale device, to authorize consumer bank card or personal check transactions, IBM said.

To handle a credit card purchase at a clothing store, for example, the clerk passes the customer's card through the terminal's magnetic stripe reader and keys in the purchase amount.

Using the terminals, users can obtain validation of a cash card or guarantee a check. Additionally, banks, savings-and-loan associations and credit unions can use the terminals to transfer transaction funds directly from a shopper's to a merchant's account, the vendor said.

The devices can be linked directly – without an attachment unit – to a private communication line, according to the company. The line connects the terminals to a central mainframe via a communications controller.

The 3608 features the same capabilities as the 3606, plus an alphanumeric printer which can provide a sales receipt and other documents.

The 3606 and 3608 models 2 may be purchased for $1,125 and $2,225, respectively. They also are available under IBM's Alternative Term Plan, which provides for a 60-month contract period, for monthly charges of $39 and $72. First customer shipments are scheduled to begin early next year, IBM said.

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The twin-cassette *Silent 700*® Model 733 ASR data terminal from Texas Instruments is supported by every leading U.S. timesharing service company, a few of which are indicated here.

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User programs are stored on cassette locally, reducing the cost of disc file storage at the remote computer.

The Model 733 ASR lists for $2895*, including printer and twin cassettes. Attractive lease rates are available. And it is backed by worldwide TI service and support.

For more information, contact your nearest TI office. Or write Texas Instruments Incorporated, P.O. Box 1444, M/S 784, Houston, Texas 77001. Or call 713/494-5115, extension 2124.

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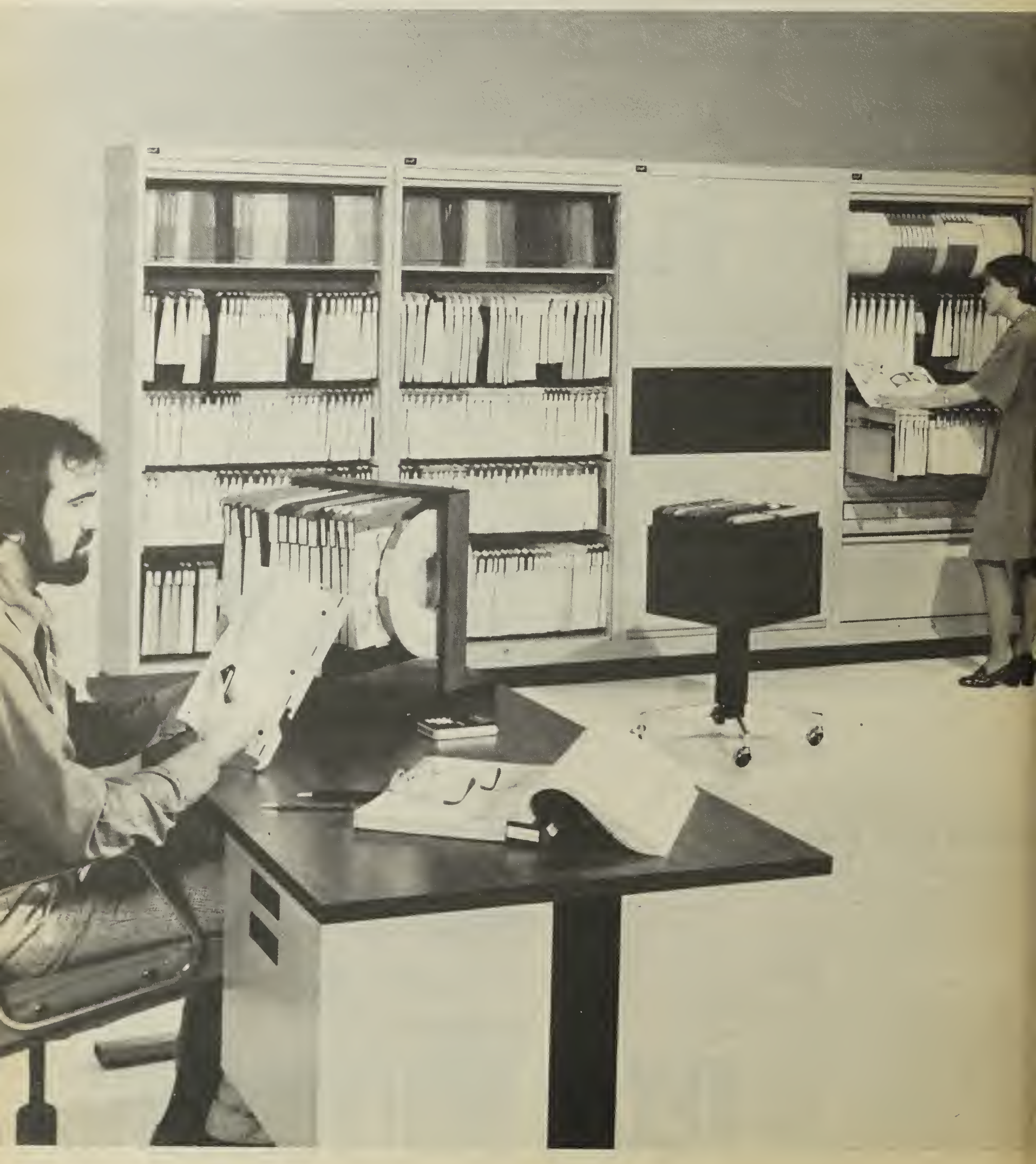
*U.S. Domestic Price

See this product at the National Computer Conference.

TEXAS INSTRUMENTS.

Four problems in Data
. . . and how Wright Line's
System helps you



Processing Documentation New Documentation Handling solve them . . .

1 The many different sizes and shapes of documentation . . . manuals, computer reports and listings, flow charting and layout forms, punched cards and even magnetic files . . . don't fit properly into conventional office equipment.

2 Various documentation that is used together should be filed together. Even special purpose equipment doesn't allow you to intermix different sizes and shapes.

3 Reference documentation should be at your fingertips. Existing equipment does not recognize both a filing mode and a reference mode.

4 Documentation moves physically from place to place; in systems, programming, operations and user departments. Existing equipment does not provide total compatibility at all locations.

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Documentation Handling System provides the answer to these problems and gives you the tool you need to organize and control your D.P. Documentation System.

With its new center hook hanging concept, Wright Line's documentation handling system provides hanging cartridges for software, hardware and user manuals; hanging cartridges for print-out reports and listings; hanging binders for user output reports and hanging folders and document holders for every size and shape of documentation including cards, microfiche, flow charts, layout forms and project correspondence. And, each device fits interchangeably into all equipment in the line. You can choose from a wide variety of equipment designed for both filing mode and reference mode use. The line is so complete you can configure work station and library environments to your exact needs from the ground up or add new organization and control by combining elements of this new system with your existing furniture.

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Offices and representatives in principal cities throughout North America

Datashare Gets Net Facility

SAN ANTONIO, Texas – Datapoint Corp. has added a network facility to its Datashare terminal system which it said permits a CPU to access and process data stored in remotely located files.

With this facility, called DS3NET, a central Datashare system can communicate with remote Datapoint processors and handle processing tasks that require data stored at the remote locations, according to the firm.

The addition of this feature means data gathered in field-located intelligent terminals or remote processors can be used in the generation of home-office reports without transferring the complete files to the host CPU.

The CPU can use the remote files with all the facilities, access methods and programming ease that would be available if the files were local, the firm said.

In a typical operation, when daily data entry and preprocessing activities have been completed at the field location, the remote system automatically dials the CPU using standard telephone lines.

The DS3NET network facility enables the remote installation to effectively become an extension of the host system, Datapoint said. The central system can use the remote printer located at the field site, for example, to print the results of its processing operation.

The DS3NET software facility can be incorporated into existing Datashare configurations by loading the contents of a cassette into the system.

The capability costs $15 plus a small fee for documentation. It is available now from 9725 Datapoint Drive, San Antonio, Texas 78284.

Data Entered on CRTs

NCR Inn-Tact Hotel System Bows

DAYTON, Ohio – A reservations and guest accounting terminal system for 200- to 700-room hotels has been introduced by NCR Corp.

The turnkey system is called NCR Innkeeping Travel Accommodations Computer Technique (Inn-Tact). It includes the microprocessor-based NCR 7797 terminal processor, disk storage devices, and desktop matrix printers capable of printing up to 165 char./sec, NCR said.

All data is entered by hotel employees through 7797 CRT terminals. A format appears on the screen and the employee supplies the information needed by filling in the blanks.

The information is then stored on the magnetic disk and can be retrieved when needed. Should a hard copy of the information be required – for example, to produce a guest bill – the printer duplicates the information on the CRT screen.

The terminal-based system provides a variety of reservations, billing and revenue reports. For example, listings can be produced each night showing next-day arrivals, type of lodging required, length of stay and other information needed for planning by hotel personnel.

A preregistration card can be prepared in advance so the guest validates the information on arrival rather than filling out a complete form. Guest bills, accounts receivable reports, aging reports and revenue reports are produced automatically, NCR said.

The rental cost of the system for a 250-room operation averages less than $10 per room/mo, the firm said.

The integrated system can include up to four NCR 7797 terminal processors, up to two disk units with combined storage capacity of 18.6M bytes and up to four matrix printers. The separate reservations system and/or guest accounting system can each be configured to include the same.

Terminal Transactions

Prentice Announces Multiplexer Models

PALO ALTO, Calif. – A line of multiplexers designed to enable several terminals to use a single leased line are available from Prentice Corp.

Designated the M series of the firm's frequency division multiplexers (FDM), the units can operate over standard 3002 voice-grade lines and carry data at rates of from 75 bit/sec to 1,200 bit/sec, Prentice said.

Over conditioned voice-grade lines, the M series can multiply up to 25 75 bit/sec terminals or combinations of data and voice over the same line, the company added.

The modules consist of two printed circuit boards – the channel receiver and the channel transmitter and control. They are designed to plug into all existing Prentice housings and have built-in diagnostics and LED indicators, the company said.

The M series can interface with RS-232- and CCITT-compatible terminals and can operate with terminals requiring the 20 Ma loop interface, Prentice said. Other interfaces are available.

The price is $545 for a stand-alone unit and individual modules start at $465. Prentice can be contacted at 795 San Antonio Road, Palo Alto, Calif. 94303.

BR Adds 5-In. CRT To Series 2200 Line

TRUMBULL, Conn. – Bunker Ramo Corp.'s (BR) Information Systems Division has added a 5-in. CRT data terminal to its Series 2200 line.

The Model 90/11A displays up to 480 alphanumeric characters and has a block-style keyboard which includes an 11-key numeric keypad, 12 function keys, nine edit and control keys and six special symbol keys.

It measures 11 in. wide by 16 in. deep by 5-7/8 in. high and weighs 17 lbs.

The 90/11A operates through a BR Series 2200 control unit which will communicate with on-line host CPUs, the firm said.

The price of the 90/11A is $950 and delivery is 90 days from 35 Nutmeg Drive, Trumbull, Conn. 06609.

Wang gives you more small computer than IBM. For less.

Wang makes the series 2200 small computing system. IBM makes big computers and three small computers. We've talked about how we make a better small computer than their 5100. Now let's talk about their System/32 and the /3.

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Wang has a fixed/removable disk. It takes 4 minutes to remove and file. You can't remove the System/32's disk. You spend about 4 hours copying it on 40 separate diskettes and file them.

Start a Wang small computing system for under $6,000*. Or buy IBM's 5100 for $8,900*. Or their System/32 for $33,000*. And for $100,000* you can have their System/3.

The question is: do you want to pay for a big small computer from Wang? Or a big name like IBM?

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WANG

We happen to make a better small computer than IBM.

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Sperry's Lyet to Give Keynote

Four Special Plenary Sessions to Highlight NCC '76

NEW YORK – The 1976 National Computer Conference (NCC) will open on Monday, June 7 with a keynote address by J. Paul Lyet, chairman and chief executive officer of Sperry Rand Corp.

Lyet plans in his speech to explore the challenges facing the computer industry in the future, according to the American Federation of Information Processing Societies, Inc. (Afips), the conference's sponsor.

Also addressing NCC will be Dr. Anthony Ralston, president of Afips, at a special plenary session on June 8. Focusing on computer sciences and information processing, Ralston will discuss the prerogatives, duties and obligations of the scientist and technologist.

The role and responsibilities of professional societies and the need for a greater understanding of and involvement in international issues related to information processing will also be covered by Ralston.

Four Plenary Sessions

There will be four special plenary sessions at NCC, and they are open to all conference attendees. In addition to the Ralston session, there will be an international plenary session on Monday chaired by Bob O. Evans, president of IBM's Systems Communications Division.

"The Computer Profession" will be the focus of a plenary session on Tuesday. It will be chaired by Dr. Ruth M. Davis, director of the Institute for Computer Sciences and Technology at the National Bureau of standards.

A plenary session on "Public Policy and Computers" will be held Wednesday and chaired by Janice C. Lipsen, president of Counselors for Management, Inc.

Some of the special activities included in the NCC program will be the National Student Computer Fair, the Computer Graphics Art Exhibit, a technical demonstration of networking and interactive computer communications utilizing the facilities of Telenet's national network, the annual NCC Computer Science Film Theater and a multimedia presentation by the Mimi Garrard Dance Theater.

NCC Preview

A preconference briefing will be held for NCC registrants on Sunday, June 6 and will be repeated Monday, June 7.

The briefing, "How to Benefit From Attendance at an NCC," will provide an overview of the conference sessions,. guidelines on attending the exhibit and a description of professional development seminars, special activities and and Bicentennial events coinciding with this year's NCC.

The conference sessions have been divided into three major areas – "Computers and People," "Systems" and "Science and Technology". Each area consists of approximately 40 sessions within four topic tracks.

"Computers and People" will explore such topics as data security, public policy issues, computers and the physically handicapped, public access to computers, industry and university relationships, software productivity, criminal justice systems and medicine and health care.

The four tracts within this area will be "Societal Concerns," "Computer Profession," "Issues in Computing" and "Applications Serving People."

"Systems" will explore the aspects of contemporary systems, including their design, measurement, management and application.

Some of the topics to be covered include system design, system management and planning, word processing and office automation, microprocessors, minicomputers, computer system performance and evaluation, minicomputers, computer-assisted manufacturing and computer-controlled publication.

'Science and Technology'

"Science and Technology" will focus on developments in computer science and their applications as well as data base architecture and software.

"Emphais will be on the implications of those ideas which will impact further future computer usage, management and operation of computer systems," Afips said.

"Computer and Data Base Architecture," "Software," "Computer Science" and "Applications of Computer Science" will be the four tracts within this area.

Attention will be focused on computer architecture, software design and engineering, artificial intelligence, data base architecture, developing data base systems, programming languages, mathematical programming, computer graphics and computer studies in the humanities.

Conference Continuing to Grow As 304 Vendors Sign Up to Show

NEW YORK – The National Computer Conference (NCC) has developed the habit of growing larger every year – and 1976 will be no exception, according to the American Federation of Information Processing Societies, Inc. (Afips), the conference sponsor.

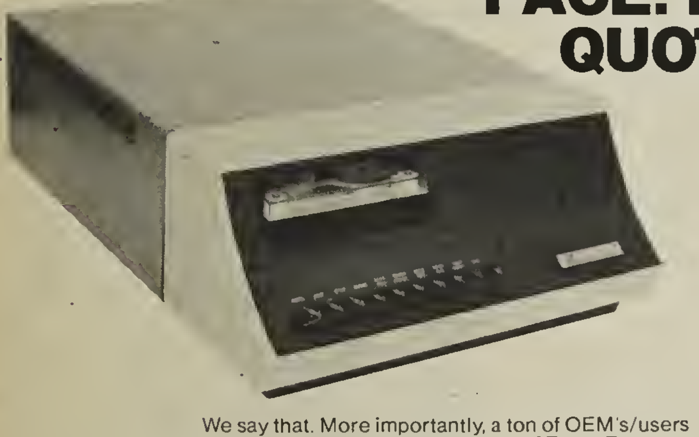
This year there will be 304 exhibitors using 943 booths at the New York Coliseum here on June 7-10. Afips expects between 35,000 and 40,000 attendees to view those exhibits.

In 1975, 34,226 attendees visited NCC in Anaheim, Calif. At that show, 278 companies rented 799 booths on the exhibit floor.

The NCC exhibitors will be in the following categories: mainframes, minicomputers, data communications equipment, data conversion systems, displays, tape systems, memory systems, plotters, printers, software services, source data collection equipment, terminals, test equipment, time-sharing services, components, supplies and accessories.

Further information on the conference is available from Afips at 210 Summit Ave., Montvale, N.J. 07645.

QUOTE: THREE PHOENIX' TCT-300 IS THE WAY TO WED THE 3M CARTRIDGE AND THE RS-232 INTERFACE. ENQUOTE.



We say that. More importantly, a ton of OEM's/users are saying that. You? Consider: The TCT-300 Transceiver is ANSI compatible, microcomputer controlled, plug-in compatible with RS-232 equipment. It's available in table top or rack mounted versions. It provides 300,000 or 1.2 million character storage capacity. It's suitable for off-line or on-line operation. It features switch selectable transmission speeds from 110 to 2400 baud, forward and reverse high speed search, exclusive error checking, error recovery and retransmission capability, complete editing capability including character insertion and remote control of all functions.

For all that, it's a surprisingly economical unit. Now who could ask for more?

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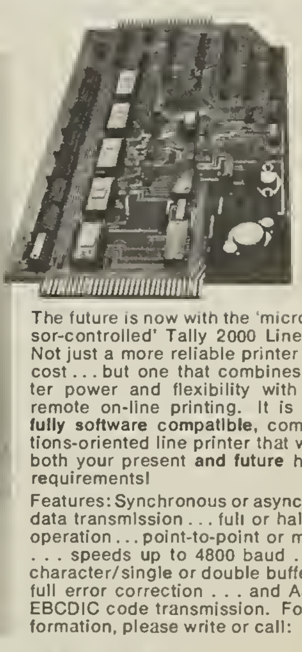

The future is now with the 'microprocessor-controlled' Tally 2000 Line Printer. Not just a more reliable printer at lower cost . . . but one that combines computer power and flexibility with reliable remote on-line printing. It is the first **fully software compatible**, communications-oriented line printer that will meet both your present **and future** hardcopy requirements!

Features: Synchronous or asynchronous data transmission . . . full or half duplex operation . . . point-to-point or multidrop . . . speeds up to 4800 baud . . . 1000 character/single or double buffering . . . full error correction . . . and ASC II or EBCDIC code transmission. For full information, please write or call:

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MRI Planning to Demonstrate System 2000 Version 2.7 DBMS

NEW YORK – MRI Systems Corp. will exhibit Version 2.7 of its System 2000 data base management system (DBMS) at Booth 1115.

Using the updated release in general processing batch and on-line environments have shown throughput improvements by factors of 2:1 and 4:1, MRI said.

Version 2.7 features include multiple virtual storage compatibility and a buffer manager, the company said.

Other enhancements include an extended Where Clause which allows key- and nonkey elements in the clause for Immediate Access; Report Writer and the Extended PL/1 precompilers; improvements to self-contained language processing in multithread teleprocessing environments; additional statistical aids for data base administrators; and an extended procedural language interface Cobol precompiler and PL/1 precompiler.

MRI's version of IBM's Release 2.70 is priced from $30,000 to $110,000 depending on modules selected, MRI said from P.O. Box 9968, 12575 Research Blvd., Austin, Texas 78766.

Software at NCC

Cullinane Spotting EEO Program Package

NEW YORK – Cullinane Corp. will show several of its software packages at Booth 1411.

One of the newer products featured will be its EEO-Affirmative Action Reporter, designed to assist Equal Employment Opportunity (EEO) officers and personnel department managers in preparing reports and implementing affirmative action programs, the company said.

The package generates reports to analyze workforce composition, employee participation in job decisions, minority employment, demographic data and applicant flow, Cullinane said.

Other packages that will be exhibited include Culprit, an output processor that provides file retrieval and report generation; EDP Auditor, an audit retrieval system; and the Integrated Data Base Management System (IDMS), which is an implementation of the most recent Codasyl Data Base Task Group language specifications, the company said.

EEO–Affirmative Action and Culprit are priced at $20,000, EDP-Auditor at $15,000 and IDMS at $40,000 from the firm at Wellesley Office Park, 20 William St., Wellesley, Mass. 02181.

Filegard to Launch 'Unwrite Ring' Unit

NEW YORK – A hardware method to prevent undesired erasure or alteration of data from magnetic tapes will be introduced by Filegard Systems at Booth 1032.

Called Filegard, the product is the opposite of the file protect/write ring inserted in the magnetic tape reel grove to activate the "write enable" switch.

It is, instead, an "unwrite ring" which physically blocks insertion of the file protect/write ring without activating the "write enable" switch.

The product, which effectively converts the magnetic tape to read-only storage, requires a tool for removal which can also be used to install it.

Available in quantities of 1,000, Filegard costs $195 each and can be obtained from the firm at P.O. Box 3114, Tequesta, Fla. 33458.

Spacesaver Has Filing Units

NEW YORK – Maintaining computer records requires storage space, and Spacesaver Corp. said it will show attendees ways to maximize that space at Booth 2001.

The company will introduce its most recent line of manual and electric mobile filing and storage carriage systems ranging from 3-ft mini units to 68-ft carriages.

Spacesaver is at 1450 Janesville Ave., Fort Atkinson, Wis. 53538.

Booth 2104 Showing Audit Analyzer

NEW YORK – Analysis – through software packages – will be the order of the day at Program Products, Inc.'s Booth 2104.

The Audit Analyzer incorporates an Audit Function Library which is said to provide easy access to over 30 auditing procedures and produce complete audit reports.

A complete information retrieval analysis and presentation system for business and DP applications, the Data Analyzer offers a multilevel language facility.

The Audit Analyzer costs $15,000 for DOS and an additional $1,000 for OS applications; the Data Analyzer costs $16,000 and $18,000.

There are options available with both products, Program Products said from 95 Chestnut Ridge Road, Montvale, N.J. 07645.

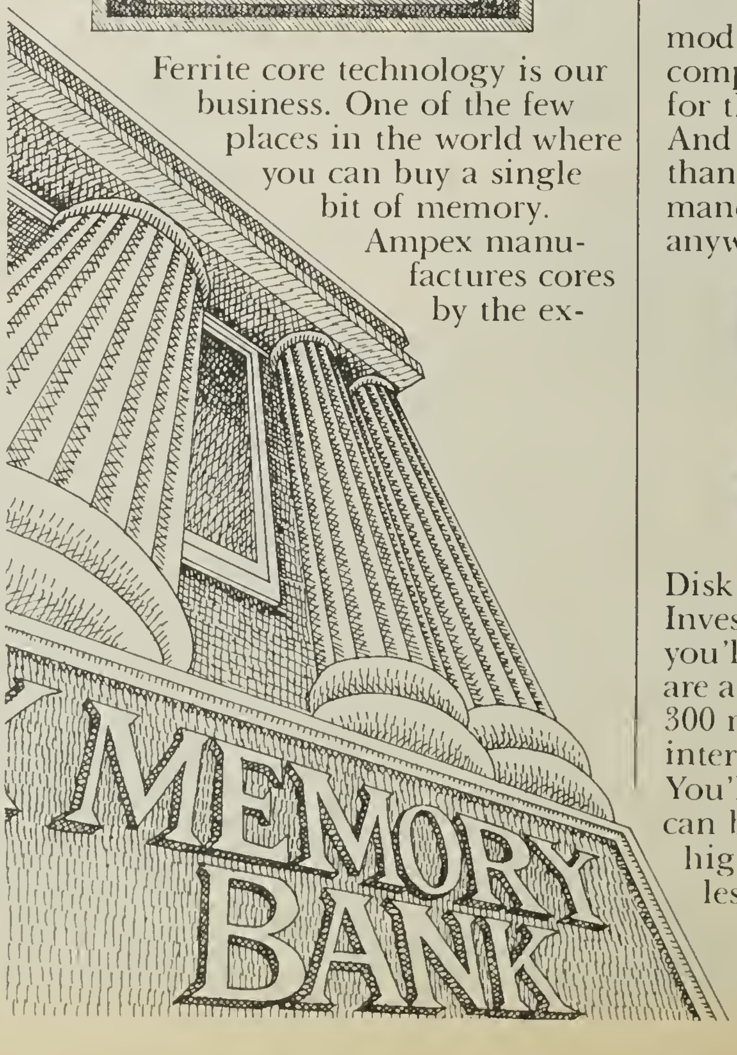
ICS Featuring Gino-F Family

NEW YORK – Innovative Computer Systems, Inc. (ICS) will be featuring the Gino-F family of graphics programs at its booth.

The Gino-F is a library of Fortran subroutines used to create graphics and is machine- and device-independent, according to the firm.

The graphics system is installed on minis as well as larger machines and may be used interactively or in batch mode, the firm said.

ICS, which is at 525 Providence Highway, Norwood, Mass. 02062, is agent for the creator of Gino-F, the Computer Aided Design Centre of the UK.



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Ferrite core technology is our business. One of the few places in the world where you can buy a single bit of memory. Ampex manufactures cores by the exclusive UNIBIT™ process, turning out millions of identical cores from the same batch of material. The secret? We punch our cores out of tape. The first core and the millionth core are identical.

Check out the MCM non-volatile RAM. Modules specifically designed for microcomputer-based systems feature compact size, fast access, and data-saving circuitry that remembers even when the power goes out.

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Disk drive technology is our specialty. Invest a few minutes in study time, and you'll see that Ampex disk drives are available with capacities from 40 to 300 megabytes, and share common interfaces. That means easy growth. You'll also see that many Ampex drives can be upgraded in the field to a higher capacity. Growth costs a lot less with Ampex drives.

Communications at NCC

Interactive CRT Also Bowing

Digi-Log DLM II Line Fault Isolator Slated to Debut

NEW YORK – Digi-Log Systems, Inc. will introduce its Model DLM II communication line fault-isolation device and the Telecomputer II interactive CRT terminal at Booths 2014 and 2016.

Telecomputer II Briefcase CRT

The DLM II diagnostic test unit offers standard features including a CRT display of the upper- and lower-case Ascii character set, a half-intensity display to separate transmitted from received data and a 1,280-character display field, the company said.

All the features of the DLM I have been retained in this model, Digi-Log said, including monitoring and LED display of line-error and RS-232 line status signals and 15 selectable data rates up to 9,600 bit/sec.

The DLM II is priced at $2,495.

The Telecomputer II briefcase CRT terminal, which replaces the company's models 209 and 33, incorporates switch-selectable line lengths on a 1,280-character display and transmission rates from 50- to 9,600 bit/sec, the firm said.

The interactive terminal costs $1,295; with acoustic coupler, 5-in. CRT and case, it is priced at $1,795.

ICC/Milgo to Show Working Tech Control Center

NEW YORK – An exhibit of the ICC/Milgo Communications Center demonstrating centralized data network monitoring and control will be featured at Booth 2201.

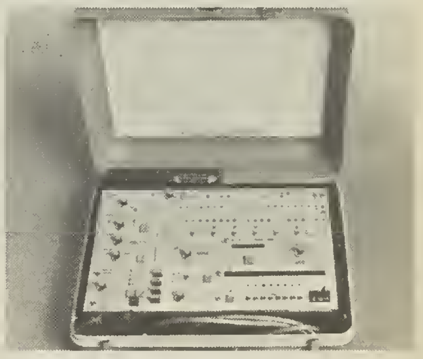
The center offers the systems operator the capability to monitor and control a data communications network from a central facility, the company said.

Users can tailor a Communications Center to their requirements by combining modules such as EIA and VF patch panels, data line monitors, status displays and communications test equipment, according to a spokesman.

Each center is configured to the individual customer and price is dependent on the user's requirements. ICC/Milgo is at 8600 N.W. 41st St., Miami, Fla. 33166.

ARC to Demonstrate Intershake Monitor

NEW YORK – Atlantic Research Corp. (ARC) will demonstrate the Intershake II programmable data communications monitor and interactive tester at Booths 1542 and 1543.


ARC Intershake II

The tester is said to handle all transmission codes and line disciplines at speeds up to 256 kbit/sec with an external clock and provides for half- and full-duplex testing, the firm said.

Atlantic Research is located at 5390 Cherokee Ave., Alexandria, Va., 22314.

NAC Bringing Tools To Help Design Nets

NEW YORK – Network Analysis Corp. (NAC) will hold demonstrations of computer-aided design tools related to computer and communications network architecture at Booth 1102.

The company is also featuring related services including feasibility studies, requirements analysis, technical strategy evaluation and analysis and design, among others, it said from Beechwood, Old Tappan Road, Glen Cove, N.Y. 11542.

Vadic Plans Introduction Of Macs at Booth 2846

NEW YORK – Macs will debut at the Vadic Corp. exhibit at Booth 2846.

Macs stands for Multiline Automatic Calling System. It will be shown along with Vadic's VA831, an RS-232/RS-366 adapter, and the VA3400, a full-duplex 1,200 bit/sec modem for use on two-wire leased lines.

Macs reportedly enables a single computer port to initiate dialing on up to 60 lines; each dialer controls up to 15 modems, Vadic said from 505 E. Middlefield Road, Mountain View, Calif. 94043.

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Withdraw spare parts from your inventory, and you'll find another strong reason to use Ampex disk drives. The high degree of parts commonality among various models means you'll deposit far less inventory in your stores department, and save both time and money when it comes to maintenance.

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TBM™ Mass Storage System (MSS) gives you the largest data deposit/withdrawal service in the industry. TBM provides amazing performance, thus return on investment. If you have anywhere from tens to hundreds of billions of bytes of data, we are the right branch for you.

The TBM Mass Storage System provides an on-line data banking system already implemented on IBM, CDC and DEC systems. Gone are the snafus from conventional tape handling operations. Extinct are the operational pains associated with disk pack mounting. Reduced is the amount of idle, infrequently-used data on rotational storage systems. With TBM, your total data base is available in seconds.

TBM gives you on-line, on-time data banking at the highest demand performance rates available in MSS systems. TBM, in combination with other peripheral data storage devices, gives you the highest rate for your dollar.

The Ampex large data base banking service is available for IBM, CDC and DEC mainframes today. Our implementation, however, is aimed at easy extension to other mainframe systems, so we invite inquiries from every user.

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Redwood City, California 94063
(415) 367-2011

Ampex Mass Storage Systems
1020 Kifer Road
Sunnyvale, California 94086
(408) 738-4910

AMPEX REMEMBERS

3M Plans Displays

NEW YORK – The 3M Co. will display its Laser Beam Recorder, Beta System 700H with optional disk file and Model 114 computer output microfilm (COM) fiche reader at Booths 3001 and 3003.

The Laser Beam Recorder records data from a computer to microfilm and microfiche. It writes alphanumeric images directly on 3M Dry Silver Film and produces 16mm or 106mm film.

The Beta System 700H is a minicomputer-controlled COM unit whose output formats include indexing and titling of fiche from standard print tapes. The system can produce both alphanumeric output and graphic images on film, the firm said.

The Model 114 fiche reader offers a three-quarter size COM image on a bright screen, 3M said from its Microfilm Products Division, 3M Center, St. Paul, Minn. 55101.

BTI to Launch Interactive T/S Systems

NEW YORK – Basic Timesharing, Inc. (BTI) will introduce three incentive timesharing systems at Booth 1529.

The models 4000/15, 4000/25 and 4000/35 will replace BTI's 4000/10, 4000/20 and 4000/30 systems. Improvements have been made in central processor performance, on-line storage, software mobility and system packaging, BTI claimed.

All models feature software backup and entry via a magnetic tape unit utilizing a tape pack, BTI said.

Bidirectional communications between each BTI system and another computer is also possible now with the addition of optional dual polling ports, which are compatible with Bell 202C-type modems and have dial-out capability, the company said.

Each model in the 4000 series incorporates the same central porcessor with 64K bytes of semiconductor memory.

The Model 4000/15 provides 7.5M bytes of nonremovable disk storage; it sells for $35,950.

The Model 4000/25 includes 49M bytes of on-line storage; it is priced at $56,300.

The Model 4000/35 has 73M bytes of on-line storage; it costs $64,300.

BTI is at 650 N. Mary Ave., Sunnyvale, Calif. 94086.

Cade to Highlight Univac Exhibit

NEW YORK – Univac will demonstrate its 1900 Computer-Assisted Data Entry (Cade) system as well as the Uniscope 100 and 200 visual display terminals at Booth 3210.

Cade is a shared-processor, key-to-disk system. The basic configuration includes one to eight keyboards with visual displays; a CPU with 48K bytes of main memory and a disk subsystem; and 7- or 9-channel tape transport, Univac said.

One of the Uniscope 200 units will be linked to a Univac 9400 computer system at the Sunnen Products Co. in St. Louis to demonstrate the Univac Industrial System (Unis) manufacturing control program.

Other terminals will be used to demonstrate educational language and government information systems, Univac said from P.O. Box 500, Blue Bell, Pa. 19422.

Uniscope 100 Terminal

Systems at NCC

Hendrix Showcasing Page Reader for OCR

NEW YORK – A demonstration of the recently introduced OCR-2 will be given by Hendrix Electronics, Inc. at Booth 2042.

Hendrix described the optical character recognition (OCR) device as "an inexpensive, high-performance optical page reader for OCR-A or OCR-B fonts." The unit reads up to 220 char./sec, the firm said.

The OCR-2 offers automatic elimination of multiple spaces and end-of-line hyphens; TTS coding is available for paper tape output, Hendrix said.

A "forms limit switch" permits the OCR-2 user to identify any portion of the page depth of a "forms" area which should not be scanned, the company added.

To demonstrate the product, it will be used as an input device for a Hendrix editing terminal, the Model 5200, which will display the typed copy being fed into the OCR-2 on a video display screen, Hendrix said.

The OCR-2 is priced at $11,500 for single units, Hendrix said from 645 Harvey Rd., Manchester, N.H. 03103.

Documation Gearing Exhibit To Impact Line Printer

NEW YORK – The Documation, Inc. DOC 2250 impact line printer will be shown at Booth 3230.

The printer is capable of printing at a speed of 2,250 line/min, single-spaced, using a graphic 48-character set, Documation said.

A freestanding unit containing its own power supply and control logic in an integrated controller, the DOC 2250 communicates through its interface with a host CPU.

Documation can be reached through Box 1240, Melbourne, Fla. 32901.

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Systems at NCC

MRS-90 Graphic Display System Scheduled for Exhibit by Ragen

NEW YORK – A graphic information system said to eliminate the need for paper files and 75% of hard-copy printout can be seen at Booths 1015 and 1017, according to its vendor, Ragen Information Systems.

The Ragen MRS-90 graphic information system retrieves, displays and offers hard copy of any page or series of pages out of more than one million letter-size pages of graphic information in an average of 10 secs, Ragen said.

Information stored on computer output microfilm (COM) is particularly accessible with this device, the company noted.

Modular in construction, the system consists of a terminal, a memory unit and a data capture center.

In addition to accessing 16mm roll-film COM, the system is capable of multiplexing up to 15 terminals by hard-wire or voice-grade telephone lines; provides hard, dry copy on demand; secures confidential information; and can be interfaced to such peripherals as line printers, punched card readers, magnetic tape transports, CRTs and tape cassettes, the company said.

The MRS-90 is available from the firm at 77 Water St., New York, N.Y. 10005 for less than $70,000. Rental and lease plans are also available.

Imlac to Star Three PDS-4s

NEW YORK – Imlac Corp. will exhibit three of its PDS-4 interactive graphic display systems at Booth 1101.

Each system is complete with a programmable minicomputer and can operate as either a remote terminal or freestanding graphics system.

Prices start at $17,300, the company said from 150 A St., New England Industrial Center, Needham, Mass. 02194.

Imlac PDS-4 System

Peripherals at NCC

Printronix Readying Series 300 Printer

NEW YORK – Printronix will exhibit its 300 Series matrix printer at Booth 1816.

The unit has a print speed of 300 line/min or 170 line/min for double-height characters and 240 line/min when underlining or printing lower-case characters with tails below the line, the company said.

Characters are printed in a 7 by 9 dot matrix format at 132 char./line and 10 char./in.; the character set contains 64 standard Ascii characters, it added.

A basic Series 300 printer with a Data Products, Inc. or Centronics Data Computer Corp. interface and electronic vertical forms unit costs $4,500 from Printronix at 17935 Sky Park Circle, Irvine, Calif. 92707.

Program Loader Debut Planned by Qantex

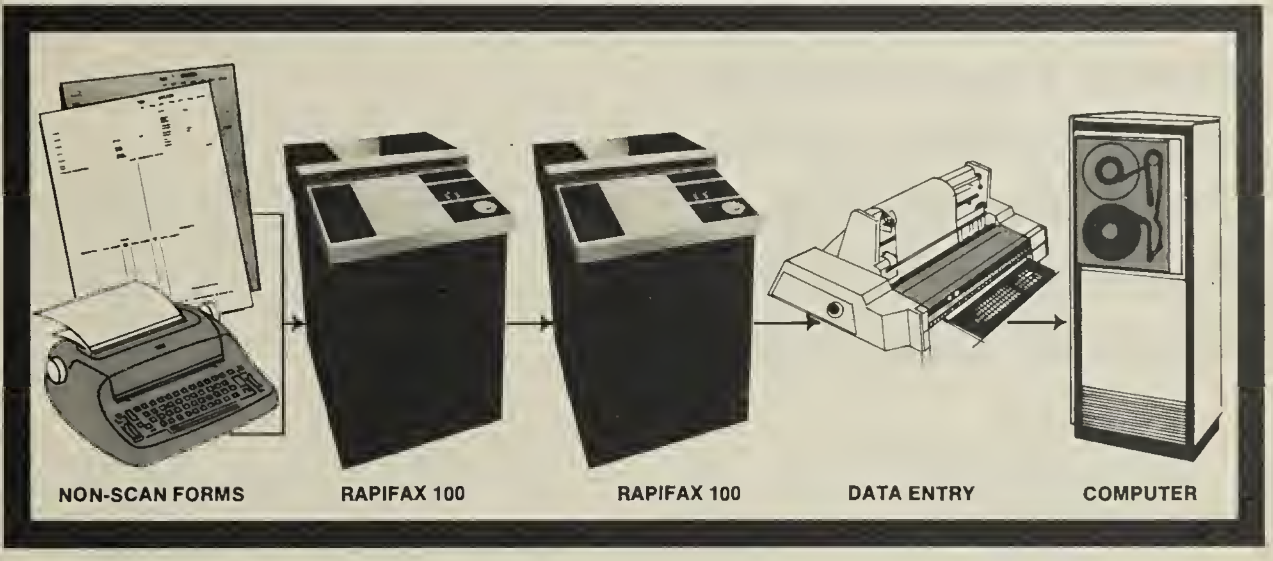
NEW YORK – Qantex Division of North Atlantic Industries, Inc. will unveil its Model 2710 portable program loader/logger and a militarized cartridge magnetic tape unit at NCC Booths 2831 and 2833. Both units utilize the 3M Co. data cartridge.

Interfaces for Most Minis

The 2710 is available with up to two tape drives and interfaces for most minis and micros, according to the firm at 200 Terminal Drive, Plainview, N.Y. 11803.

Price of a 2710 with one tape drive and no interface starts at $2,285 in unit quantity.

The transfer rate of both units is 6,000 byte/sec, and density is 1,600 bit/in.



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Drives Have Inertial Actuator

Diablo Plans to Put Series 400 to Work

NEW YORK – Several disk and printer products will be introduced and demonstrated by Diablo Systems, Inc. at Booth 3320.

A working display of the Diablo Series 400 disk drives will demonstrate some of the features of this family of cartridge drives, which offer a Diablo-developed inertial actuator that permits two head positioners in each drive package, the firm said.

100% Common Spares

The Series 400 drives, which are offered in capacities up to 40M bytes, have 100% common spares, common dimensions and operational features such as power interrupt protection and data track servo following, Diablo said.

Diablo's matrix printer will also be demonstrated. It can print at speeds up to 200 char./sec and has a Diablo-designed 9-wire matrix head that prints both upper- and lower-case characters, the firm said.

Peripherals at NCC

Other features include microprocessor control, internal power supply, ribbon cartridges and a line of accessories, the firm added.

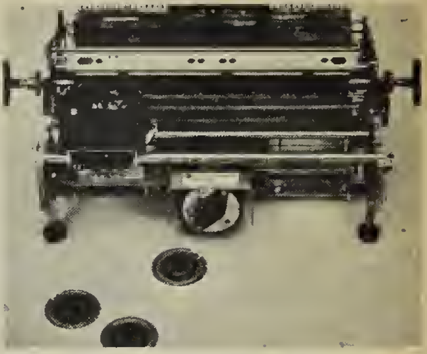
Diablo will also demonstrate its Hyterm data communications terminal's graphics capability, print quality, high-speed tabbing and other features, it claimed. The unit is RS-232C compatible and communicates in Ascii code, Diablo said.

Both receive-only and send/receive models will be on display.

Two Serial Printers

In addition, the Diablo booth will feature two Hytype II serial printers – a 45- and a 55 char./sec model. The printers offer bottom feed, split platen, end-of-ribbon and paper-out signals, optical character recognition wheels and an 8-bit parallel microprocessor interface, the company said.

The Model 1355WP Hytype mechanism will be shown as a printer specifically suited for word-processing applications, the company said.



Model 1355 Word-Processing Mechanism

Also on display will be the Series 30 disk drive, the Model 44B in the Diablo Series 40 line and revamped Series 10 dual flexible diskette drives.

Diablo is at 24500 Industrial Blvd., Hayward, Calif. 94545.

Termicette Recorder To Star at Booth 1511

NEW YORK – International Computer Products, Inc. will display its line of low-priced Termicette communications recorders and a fixed-disk multiprocessor at Booth 1511.

The Termicette 2020, which uses digital cassettes for recording and playback at rates up to 1,200 bit/sec was designed for program loading and microprocessors and minicomputers.

It sells for $690.

Termicette 2020

The ICP-700 multiprocessor is capable of memory partitioning in segments up to 32K bytes. Priorities are established as a function of the jobstream and may be reestablished by the operator, the vendor said.

The smallest version is equipped with a 32K CPU, CRT, dot matrix printer and 9.6M-byte disk and is priced at $29,500.

Both are available from the firm at 2925 Merrell Road, Dallas, Texas 75229.

Wangco Exhibit to Include Magnetic Tape Systems

NEW YORK – Wangco, Inc. will be showing its magnetic tape systems for minicomputers and its tape and moving-head disk systems for Digital Equipment Corp. PDP-11 minicomputers at Booth 1521.

The company will also demonstrate related peripherals, such as formatters and controllers, Wangco said.

Wangco is located at 5404 Jandy Place, Los Angeles, Calif. 90066.

Topaz to Show Transformers

NEW YORK – A line of 50 kVA through 130 kVA transformers for ac line noise attenuation will be exhibitcd in Booths 1036 and 1038 by Topaz Electronics.

The firm will also introduce a line of uninterruptible power systems that are rated from 3 kVA through 15 kVA single phase and will exhibit its line of ac power line regulators.

Topaz is at 3855 Ruffin Road, San Diego, Calif. 92123.

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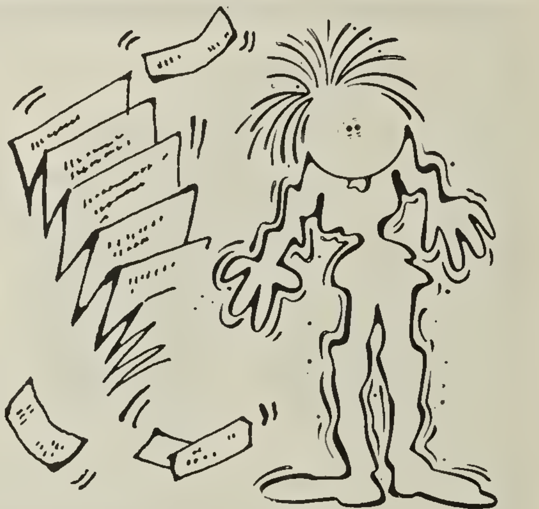

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More than a dozen leading experts will be on hand to participate in this provocative new seminar on disasters that can happen with computers, and how to protect yourself from them. Co-sponsored by *Business Insurance* magazine and *Computerworld*, this two-day seminar presents you with a comprehensive analysis of important subjects like these: disaster case histories, EDP facilities planning, protection planning, negotiating computer lease contracts, business interruptions and recovery costs, managing telecommunications risks, computer audits, and much more.

Cost for the entire seminar, including continental breakfasts, luncheons, dinner, and all course materials is $325 per registrant, and $300 for each additional registrant from the same company. An additional $50 bonus discount will apply to each registration received by June 7, 1976.

Chicago	Drake Hotel	June 17-18

Data Communications Course #1010 — Practical Data Communications Systems & Concepts

Dr. Dixon Doll, the nationally recognized teleprocessing consultant will lead this two-day seminar on the newest advances in data communications. The course covers areas like SDLC, HiD-LoD, DDS, newly approved major revisions to WATS, and the impact of Satellite Carriers.

Total Cost, including workbook, reference materials luncheons and continental breakfasts is $350. Additional registrants from the same company qualify for the reduced rate of $300.

New York	Plaza Hotel	June 14-15
San Diego	Plaza International	Sept. 27-28
Denver	Brown Palace	Oct. 18-19
Miami	Holiday Inn Airport Lakes	Nov. 15-16

Data Communications Course #1020 — Advanced Teleprocessing Systems & Design

Also led by Dr. Dixon Doll, this course is a follow-up to course #1010. Special emphasis is given to techniques that minimize operating costs in commercial data communications networks. This three-day seminar covers procedures, approaches, and algorithms for evaluating and cost-optimizing network operations. Total cost, including an extensive set of customized course materials, is $450. Additional registrants from the same company qualify for a reduced rate of $400.

New York	Summit Hotel	Sept. 13-15
Miami	Holiday Inn Airport Lakes	Nov. 29-Dec. 1

Legal Tools for Computer Contracting and Protection

Under the instruction of Roy N. Freed, a nationally known lawyer, author and educator in the field of computer law, you'll learn how to increase your advantage in dealing with vendors that supply your installation. As well as practical discussion and review of your own contracts, subject areas covered in this 2½-day seminar include: Negotiations, Contracts, Warranties, Avoidance and resolution of disputes, Security, Fraud, Taxation, and Techniques for handling any transaction. Cost for the entire seminar, including continental breakfasts, luncheons and all course materials is $325. Additional registrants from the same company are charged only $275.

Chicago	Hyatt Regency O'Hare	June 16-18
New York	Summit Hotel	June 23-25

How to Increase Programming Productivity

John W. Brackett, PhD, Vice President of SofTech, Inc., will lead this two-day seminar for technical managers on the state of the art of Software Engineering. Under his direction you will learn how to: create more precise and visible analysis and design; reduce integration problems; improve software reliability; incorporate visible outputs into the software development cycle; increase programmer productivity; and improve programming management methods. Topics covered include: Structured programming; Top-down analysis, design, implementation; and Chief Programmer teams. Cost for the entire seminar, including continental breakfasts, luncheons, and all course materials is $300. Additional registrants from the same company are charged only $250.

Write for summer schedule

Performance Evaluation and Improvement

Saul Stimler, author of *Data Processing Systems: Their performance, evaluation, measurement, and improvement* will lead this two-day seminar on measurement techniques designed to save your installation money. As well as system performance at your own installation, topics covered include: Criteria for quantifying performance, pencil and paper analysis of a system, Benchmarking techniques, Realtime, Batch and interactive time sharing systems.

Cost for the seminar, including continental breakfasts and luncheons and all course materials is $250.

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Note: If time is short, you may reserve space at any seminar by calling collect. Call Miriam Ober at (617) 965-5800.

Cassette Tape Transport System For Micros at Braemar Booth

NEW YORK – A cassette tape transport system, designed particularly for microprocessor use and featuring TTL compatibility, will be displayed by Braemar Computer Devices, Inc. at Booth 2745.

Based on the vendor's CD-200 transport, the device accepts and delivers serial digital data at TTL levels at 8 kbit/sec.

Called the CS-400 digital cassette tape transport system, the unit operates at a nominal density of 800 bit/in. at 10 in./sec.

The system has two-channel capability and both tape tracks are available for data. The active channel is determined via TTL command; this feature allows the user to write one track, switch channels, change direction and continue writing on the other track, omitting the need to rewind, Braemar said.

The CS-400 utilizes the Manchester phase-encoding technique and provides Ansi-compatible data, Braemar said.

It also employs "Auto Sync," a decoding scheme with internal compensation for any bit-to-bit variations encountered.

Available in six weeks from the OEM manufacturer at 11950 Twelfth Ave. South, Burnsville, Minn. 55337, the unit costs $600 for evaluation units and $460 each in quantities of 10 and $350 in quantities of 1,000.

Peripherals at NCC

Dataproducts Sets Debuts

NEW YORK – Dataproducts Corp. will have both printer equipment and core memory systems at Booth 1329.

The Model 2290 line printer and the Mark IV printer hammer bank will be exhibited for the first time, as will the Store/3220 core memory system and a special 32K memory bank, the firm said.

The 2290 is a 900 line/min unit with a 136-character line width. The OEM price is "under $12,500" with quantity discounts available.

The display at Dataproducts' booth will also include four other printers, four memory systems previously exhibited, printer components and printer ribbons, a spokesman added from 6219 DeSoto Ave., Woodland Hills, Calif. 91364.

Versatec Plotter Going Public

NEW YORK – The first public demonstration of Versatec, Inc.'s 24-in. wide electrostatic plotter will be given at Booths 2718, 2720 and 2722.

A 72-in. electrostatic plotter, a plotter which produces hard copy from a Tektronix terminal and an OEM line of electrostatic plotters will also be demonstrated, the company said.

All together, Versatec will display eight electrostatic plotters offering a choice of 22- or 24-in. paper width, vertical plotting speed of 1- or 2 in./sec and resolution of 100- or 200 dot/in.

Versatec 24-In. Plotter

Four models offer character generation and a simultaneous print/plot option for display of captions, legends and other alphanumeric data while plotting, Versatec said.

A Versatec system controller links any of the plotters with IBM 360/370 computers; it is compatible with standard IBM software and system protocols, Versatec said.

Prices range from $13,500 for the 22-in. plotter with 100 dot/in. resolution to $22,400 for the 24-in. plotter with 200 dot/in. resolution and character generator.

The firm is at 2805 Bowers Ave., Santa Clara, Calif. 95051.

Facit-Addo to Show 3740-Like Floppy

NEW YORK – A flexible disk drive which is IBM 3740-compatible, the Facit 4231 will be featured by Facit-Addo, Inc. with other of its products at Booths 1615, 1617 and 1619.

The drive is available in both a single and dual version. Track-to-track access time is 4 msec maximum, the firm said.

In the dual model, the loading rotation and access mechanisms and the drive electronics are common, the vendor noted.

The Facit 4231 has a loading mechanism which provides "exact disk positioning" by utilizing a driving spindle and a moving, self-adjusting lightweight cone, Facit-Addo said.

The company is located at 66 Field Point Road, Greenwich, Conn. 06830.

Magnetic Stripe Encoders Focus of Mag-Tek Exhibit

NEW YORK – Booth 3313 will be the scene of the introduction of a series of magnetic stripe encoders by Mag-Tek Corp.

The MT-75 encoders operate under the control of an 8-bit microprocessor and are programmed to encode cards to industry standards, according to the company.

The read/write card transport used in the MT-75 is available as a subsystem and has an RS-232 interface, Mag-Tek said from 1513 E. Del Amo Blvd., Carson, Calif. 90746.

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Peripherals at NCC

T-300 Stores 300M Bytes

Calcomp Set to Launch Latest Trident

NEW YORK – California Computer Products, Inc. (Calcomp) will introduce the T-300, the latest member in its Trident family of disk drives, and demonstrate for the first time its table-top plotter, the Calcomp 836, at Booth 2243.

An enhanced version of its Microfiche Management System, the Calcomp 960 vertical plotter and three other members of the Trident line will also be shown.

The T-300 features a 300M-byte capacity and takes an IBM 3336-II type disk pack with a density of 6,060 bit/in., Calcomp said.

The transfer rate is 1,209 byte/sec and the track-to-track access time is 10 msec, the firm added. The unit sells for $11,750.

The 836 plotter has an RS-232C interface and can be driven on-line or off-line by a Calcomp 900 series controller, while the 960 plotter operates off-line with a Calcomp 925 controller as well as on-line to any device with an RS-232 interface.

The Microfiche Management System is a computer output microfilm (COM) unit that can be leased for about $3,000/mo. Enhancements to be demonstrated include software for fiche indexing and titling and improvements that are said to provide more efficient use of the 32K of core in the system's off-line controller.

Other members of the Trident line on display will include units with 25M-, 50M- and 80M-byte capacities.

Other Trident Models

The firm will also show both of its floppy disk drives, the 140 with a capacity of 400K bytes per diskette and the 142 with up to 802K bytes per diskette.

Calcomp is at 2411 W. LaPalma, Anaheim, Calif. 92801.

GSI to Show Floppy

NEW YORK – Booths 3410 and 3412 will be the scene of a demonstration of a flexible disk drive capable of single- or double-density operation, according to its developer, General Systems International, Inc. (GSI).

For double-density applications, the GSI-110 accommodates up to 6.4M bits of data on one side. Single-density storage in variable formats provides up to 3.2M bits of data, the firm said.

The drive is IBM-compatible and will read or write IBM 3740-formatted diskettes for up to 1.9M data bits, GSI noted.

The unit also features a one- to 4-drive daisy chain capability, parallel ready lines, and separation of clock, data and track sensing.

The GSI-110 is priced at $500 in quantities of 100, the vendor said from 1440 Allec St., Anaheim, Calif. 92805.

Dispersed Processing Sycor Exhibit Theme

NEW YORK – Sycor, Inc.'s line of distributed data processing systems – from the Model 350 intelligent stand-alone terminal to the Sycor 440 clustered terminal processing system and the 250 intelligent display system – will be shown in Booth 2731.

The Model 350 incorporates two flexible disks into a desk-top, intelligent terminal. With 16K bytes of programmable memory, the Model 350 uses TAL II, version of the company's Terminal Application Language for local inquiry/response and data entry.

Software- and communications-compatible with the Model 350, the Sycor 440 combines a 10M-character disk with up to eight video display stations.

On-Line Products

For distributed on-line applications, Sycor will be exhibiting its IBM 3270-compatible series of display stations, stand-alone terminals and printers. Equipped with its own user-programmable language and a dual flexible disk option, the Sycor 250 allows users to store formats or programs locally on diskette.

All three product lines will exhibit Sycor's microprocessor-controlled printers operating at 60-, 120- and 180 char./sec printers feature bidirectional printing.

Sycor is at 100 Phoenix Drive, Ann Arbor, Mich. 48103.

Techtran at Three Booths With Cassette Recorders

NEW YORK – Techtran Industries, Inc.'s display at Booths 2825, 2827 and 2829 will feature its family of single- and dual-cassette recorders.

All units are compatible with an RS-232 interface and can be plugged into keyboard printers, CRTs, minicomputers and data loggers, the firm said.

In addition, the firm will introduce the Model 9512 micro disk, a flexible disk recording/editing terminal, the company said.

The desktop unit connects to data terminals, CRTs and minicomputers, it added.

Features include IBM format, removable disks with 256K characters per disk, selectable speeds from 110- to 9,600 bit/sec, track/sector addressing, bidirectional skip, print ID selector, dual RS-232C interfaces and track/sector indicators.

The unit costs $2,500, Techtran said from 580 Jefferson Road, Rochester, N.Y. 14623.

Elgar Repackages UPS Line

NEW YORK – At Booth 2224, Elgar Corp. will exhibit at least two models of its repackaged and expanded line of uninterruptible power supply (UPS) systems.

The systems' prices range from $2,075 to $34,400, Elgar said from 8225 Mercury Court, San Diego, Calif. 92111.

Hours and Theirs

Plug our brand new Plus 70 printer and display station into your IBM 3271 or 3272 controller. A couple of hours is all we need to convince you we can outperform your 3277 or 3286 or whatever else you have tied to your 360 or 370. Designed and manufactured by Trivex, the microprocessor controlled display station and printer are both IBM compatible at the box level. And, for systems level compatibility, we can supply Trivex controllers, too. The only area in which we're *not* IBM compatible in fact, is price. The Plus 70 sells or leases for considerably less than IBM's. And it delivers in only 60 days, ready to expand whenever you expand. Delivers faster, costs less, and it's compatible. How can you go wrong? You can't. We're so sure, in fact, we're willing to make this proposition: if, after a week or so of comparison, you're still not convinced – and you stick with theirs – we'll give you a five function digital pocketwatch just for trying ours. Buy or lease ours, and chances are good we'll throw in the pocket watch anyway. Either way, give us a call as soon as possible. After all, time is money. Trivex Incorporated, 3180 Redhill Ave. Costa Mesa, California 92626 (714) 546-7781
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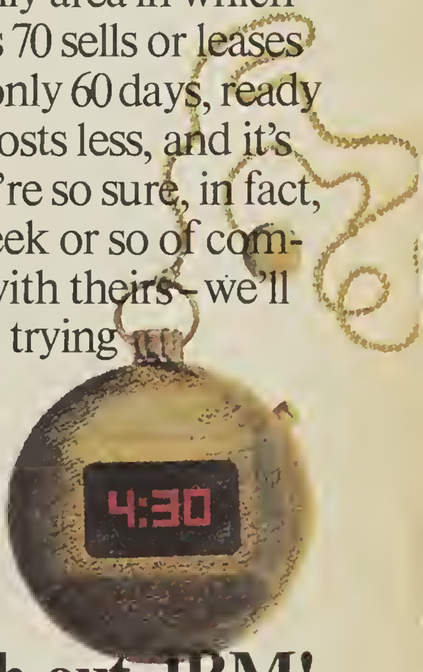

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		Frank D. De George A7 WELFARE PAYMENTS AND THE COMPUTER	*Marilyn E. Courtot* A8 DATA BANKS IN THE FEDERAL ESTABLISHMENT	*Anthony J. Patinella* A9 EFTS: THE POLICY QUESTIONS	*William R. Weber* A10 EFTS: IMPLEMENTATION PROBLEMS	*Neal Gregory* A11 DATA COMMUNICATION POLICY	*Francis Gregory* A12 PRIVACY: THE POLICY QUESTIONS	*John Salasin* A13-14 PRIVACY: THE PSYCHOLOGICAL & SOCIOLOGICAL IMPLICATIONS	
	B **COMPUTER PROFESSION** Royal B, AM	● COMPUTERS AND THE PHYSICALLY HANDICAPPED ●							
		Robert Gildea B7 COMPUTERIZED BRAILLE TRANSLATION	*Steven L. Jamison* B8 COMPUTERS AND SIGN LANGUAGE	*Harry G. Hedges* B9 COMMUNICATION AIDS FOR THE NON-ORAL	*Harry G. Hedges* B10 READING MACHINES FOR THE BLIND	B11 *Gopal K. Kapur* EXECUTIVE MANAGEMENT MUST BECOME INVOLVED	B12 *Roy F. Keller* CONCEPTS IN PROGRAMMING AND ADP INSTRUCTIONAL SYS.	B13 *Louise Etra* COMPUTER ART: NEW BREED OF ARTIST TECHNICIAN	B14 *Patsy Scala* ARTISTS & THEIR USE OF COMPUTERS
	C **ISSUES IN COMPUTING** Imperial B, AM	● INDUSTRY & UNIVERSITY RELATIONSHIPS ●				● SOFTWARE PRODUCTIVITY ●			
		Marshall C. Yovits C7 INDUSTRY NEEDS & VIEWS OF COMPUTER SCIENCE GRADUATES	*Marshall C. Yovits* C8 COMPUTER SCIENCE GRADUATES & INDUSTRY	*Marshall C. Yovits* C9-10 INDUSTRY AND UNIVERSITY — PROBLEMS AND SOLUTIONS		*Lloyd Baldwin* C11 PRODUCTIVITY PAY-BACK FROM PACKAGED APPLICATION SOFT.	*Eugene I. Lowenthal* C12 HIGH LEVEL LANGUAGES FOR SOFTWARE DEVELOPMENT	*Larry A. Welke* C13-14 QUALITY AND PERFORMANCE MEASUREMENTS FOR SOFTWARE	
	D **APPLICATIONS SERVING PEOPLE** Grand Ballroom East, NYH	● MEDICINE AND HEALTH CARE I ●				● MEDICINE AND HEALTH CARE II ●			
		Thelma Estrin D7 COMPUTERS AND BIO-CYBERNETICS	*Robert S. Ledley* D8 COMPUTERIZED TOMOGRAPHY	*Richard Shepard* D9-10 BIOMEDICAL DATA BASES		*David J. Mishelevich* D11-12 TOWARD THE INTEGRATED HOSPITAL INFORMATION SYSTEMS		*Bernice J. Proctor* D13-14 PATTERN RECOGNITION IN CLINICAL MEDICINE	
SYSTEMS	E **COMPUTER SYSTEMS** Grand Ballroom West, NYH	● MICROPROCESSORS ●				● MINICOMPUTERS ●			
		Reg E. Kaenel E7-8 UNDERSTANDING AND USING MICROPROCESSORS		*Barry R. Borgerson* E9-10 MICROPROCESSOR SYSTEMS		*S. Ron Oliver* E11-12 MINIS VS. MAXIS		*Carol Brown* E13-14 USING MINIS IN LARGE AND SMALL BUSINESSES	
	F **SYSTEMS MANAGEMENT** Mercury, NYH	● COMPUTER SYSTEM PERFORMANCE & EVALUATION I ●				● COMPUTER SYSTEM PERFORMANCE & EVALUATION II ●			
		Philip J. Kiviat F7-8 COMPUTER PERFORMANCE MANAGEMENT		*Gerald Estrin* F9 MEASURES OF PERFORMANCE	*Stephen T. Swift* F10 PERFORMANCE INFORMATION SYSTEMS	*Jeffrey P. Buzen* F11 ISSUES IN COMPUTER SYSTEMS PERFORMANCE	*Jack Moshman* F12 PROBAB. MODELS FOR PREDICT. SYS. THROUGHPUT	*William E. Perry* F13-14 COMPUTER SYSTEMS AUDITABILITY AND CONTROL	
	G **NETWORKING** Imperial A, AM	*Teresa O. Green* G7 USE OF NETWORKS IN SCIENCE & EDUCATION	*Walter A. Sedelow* G8 NETWORK ARCHITECTURE	*Stephen R. Kimbleton* G9-10 NETWORK OPERATING SYSTEMS		*Susan Poh* G11-12 NETWORK MEASUREMENTS		*Thomas Pyke, Jr.* G13-14 NETWORK ACCESS TECHNIQUES	
	H **BUSINESS AND INDUSTRY SYSTEMS** Georgian B, AM	● COMPUTER-ASSISTED MANUFACTURING ●				● COMPUTER-CONTROLLED PUBLICATION ●			
		Thomas L. Boardman H7-8 COMPUTER-AIDED MANUFACTURING AND DESIGN		*W. Barkley Fritz* H9-10 COMPUTERS IN THE SHIPBUILDING INDUSTRY		*Norman W. Scharpf* H11-12 COMPUTERS IN TYPESETTING		*Dennis R. Neary* H13-14 INTEGRATION OF MICROFILM AND COMPUTER	
SCIENCE AND TECHNOLOGY	I **COMPUTER & DATA BASE ARCHITECTURE** Georgian A, AM	● DATA BASE ARCHITECTURE ●				● DEVELOPING DATA BASE SYSTEMS ●			
		Etelle Grinoch I7 DATA BASE STRUCTURE	*Susan Brewer* I8 RELATIONAL DATA BASES	*John L. Berg* I9-10 DATA BASE DECISIONS		*Fredric C. Gey* I11-12 SOCIO-ECONOMIC FACTORS IN DATA BASE MANAGEMENT		*Patricia Berglund* I13 MANAGEMENT INFORMATION SYSTEMS	*Norman F. Hirst* I14 AN INTRODUCTION TO MUMPS
	J **SOFTWARE** Trianon, NYH	● PROGRAMMMING LANGUAGES ●							
		Herbert Maisel J7-8 PROGRAMMING LANGUAGE DESIGN		*Paul Oliver* J9-10 PROGRAMMING LANGUAGE STANDARDS: SUCCESSES AND DISAPPOINTMENTS		J11-12 *Edward Miller* AUTOMATED SOFTWARE TESTING AND EVALUATION		J13-14 *Paul Schneck* WHY (OR IF) FORTRAN WILL SURVIVE	
	K **COMPUTER SCIENCE** Gramercy, NYH					● MATHEMATICAL PROGRAMMING ●			
		K7-8 *Enrique Ruspini* APPROXIMATE REASONING AND APPROXIMATE ALGORITHMS		K9 *John McLeod* ENERGY MODELS	K10 *Roger M. Firestone* COMPUTING PHYSICS	*Patricia J. Eberlein* K11 ALGORITHMS FOR UNCERTAIN FORMS	*Jean-Paul Jacob* K12 SIMULATION VS. MATHEMATICAL PROGRAMMING	*Darwin Klingman* K13-14 OPTIMIZATION OVER GRAPHS AND NETWORKS	
	L **APPLICATIONS OF COMPUTER SCIENCE** Royal A, AM	● COMPUTER GRAPHICS ●				● COMPUTER STUDIES IN THE HUMANITIES ●			
		Stephen Levine L7 SOUND — ANOTHER DIMENSION IN COMPUTER GRAPHICS	*Joseph Scala* L8 TEACHING THROUGH COMPUTER GRAPHICS	*Richard Speer* L9 COMPUTER GENERATED FILMS	*Jackie Potts* L10 COMPUTER GRAPHICS SOFTWARE	*Joseph Raben* L11 COMPUTERS IN MUSICAL & HISTORICAL RESEARCH	*Naomi Sager* L12 COMPUTATIONAL LINGUISTICS	*A. K. Joshi and C. Rieger* L13-14 NATURAL LANGUAGE PROCESSING	

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PLENARY SESSIONS

The '76 NCC will include four special plenary sessions open to all conference attendees. Each will be held in the Grand Ballroom of the New York Hilton Hotel and will feature major presentations on issues of particular relevance to the computing field, and to concerned members of the business community and the general public.

Keynote Address
Monday, June 7
10:15 a.m.
J. Paul Lyet
Chairman of the Board
Sperry Rand Corporation

International Plenary Session
Monday, June 7
1:15 p.m.
Chairman: Bob O. Evans
President
IBM System Communications Division
Sessions Participants
Professor A. S. Douglas, University of London
Dr Anatoly A. Dorodnicin, Academician and Director of Computer Systems, USSR Academy of Sciences, Moscow
Dr. Heinz Zemanek, Director of IBM Laboratory, Vienna
Shiro Omata, President, Nippon Univac Kaisha, Ltd., Tokyo

The Computer Profession
Tuesday, June 8
1:15 p.m.
Chairman: Dr. Ruth M. Davis
Director, Institute for Computer Sciences and Technology
National Bureau of Standards
Featuring:
AFIPS Presidential Address
Dr. Anthony Ralston

Public Policy and Computers
Wednesday, June 9
1:15 p.m.
Chairman: Janice C. Lipsen
President, Counselors for Management, Inc.
Featured Address
To be Announced

NYH = NEW YORK HILTON
AM = AMERICANA

CONFERENCE AT A GLANCE

		1	2	3	4	5	6
		MONDAY AFTERNOON		TUESDAY MORNING		TUESDAY AFTERNOON	
		2:30 pm - 4:00 pm	4:15 pm - 5:45 pm	8:30 am - 10:00 am	10:15 am - 11:45 am	2:30 pm - 4:00 pm	4:15 pm - 5:45 pm
COMPUTERS AND PEOPLE	A **SOCIETAL CONCERNS** Sutton, NYH	A1-2 *Saul Padwo* WORLD ENVIRONMENT FOR DATA PROCESSING		● DATA SECURITY ●			
				A3 *Eldred C. Nelson* DATA SECURITY IN THE DOD	A4 *Rein Turn* DATA CRYPTOGRAPHY	A5 *Naomi Seligman* DATA SECURITY IN INDUSTRY	A6 *Dennis K. Branstad* SECURITY IN COMPUTER NETWORKS
	B **COMPUTER PROFESSION** Royal B, AM	B1 *Margaret Fox* 25 YEARS OF JOINT COMPUTER CONFERENCING	B2 *Walter Anderson* INFORMATION PROCESSING IN THE YEAR 2000	B3 *Anita J. Cochran* COMPUTING IN EUROPE	● PIONEER DAY ●		
					B4 *John G. Brainerd* ORIGINS OF ENIAC	B5 *Herman Goldstine* DEVELOPMENT OF ENIAC	B6 *Richard E. Merwin* POST-ENIAC TRANSFER OF TECHNOLOGY
	C **ISSUES IN COMPUTING** Imperial B, AM	C1 *Ronald A. Frank* ROLE AND OBLIGATIONS OF THE TRADE PRESS	C2 *H. W. Bomzer* DATA PROCESSING CAREER PATHS	● PUBLIC ACCESS TO COMPUTERS ●			
				C3 *Janet Kiehl* PUBLIC ATTITUDES TOWARD COMPUTERS	C4 *Evelyn R. Murphy* PERSONAL COMPUTERS	C5-6 *David H. Ahl* PUBLIC ACCESS TO COMPUTER POWER	
	D **APPLICATIONS SERVING PEOPLE** Grand Ballroom East, NYH	D1-2 *Genevieve Greenwald-Katz* COMPUTERS IN ARCHITECTURE		● CRIMINAL JUSTICE SYSTEMS ●			
				D3-4 *Bernice Pantell* THE ALEMEDA COUNTY LAW ENFORCEMENT SYSTEM OF THE FUTURE		D5-6 *Thomas J. Madden* CRIMINAL JUSTICE INFORMATION SYSTEMS AND USE OF CRIMINAL RECORDS	
SYSTEMS	E **COMPUTER SYSTEMS** Grand Ballroom West, NYH	●		COMPUTER SYSTEM DESIGN			●
		E1-2 *John C. Davis* STORAGE SYSTEMS		E3 *Nancy Betz* INTERACTIVE SYSTEMS	E4 *Stephen S. Yau* COMPUTER SYSTEMS RELIABILITY AND MAINTAINABILITY	E5-6 *Gerald Estrin* MODULAR COMPUTER DESIGN	
	F **SYSTEMS MANAGEMENT** Mercury, NYH	● COMPUTER		SYSTEM MANAGEMENT AND PLANNING			●
		F1-2 *John V. Soden* LONG-RANGE PLANNING FOR COMPUTER USAGE IN LARGE ORGANIZATIONS		F3-4 *Edward O. Joslin* ECONOMIC REQUIREMENTS AND WORKLOAD ANALYSIS: ESSENTIAL ELEMENTS OF SYSTEMS ANALYSIS		F5 *David S. Alberts* ECONOMICS OF SOFTWARE QUALITY ASSURANCE	F6 *David S. Alberts* FUTURE DIRECTIONS IN SOFTWARE QUAL. ASSUR.
	G **NETWORKING** Imperial A, AM	G1 *Peter E. Jackson* LEGAL & REGULATORY TRENDS IN COMPUTER COMMUNICATION	G2 *Ira Cotton* PROTOCOLS FOR COMPUTER NETWORKS	G3 *Franklin F. Kuo* PACKET RADIO & SATELLITE NETWORKS	G4 *Robert E. Kahn* PROGRESS IN PACKET NETWORK INTER-COMMUNICATION	G5 *Louis Pouzin* INTERACTIONS BETWEEN PRIVATE & PUBLIC DATA NETWORKS IN EUROPE	G6 (SEE "SECURITY IN COMPUTER NETWORKS" ABOVE.)
	H **BUSINESS AND INDUSTRY SYSTEMS** Georgian B, AM	H1 *Carol Johnson* ENHANCING LIBRARY SYSTEMS	H2 *Greg E. Mellen* AIR TRAFFIC CONTROL	● WORD PROCESSING & OFFICE AUTOMATION ●			
				H3 *Harvey L. Poppel* COMMUNICATIONS, COMPUTERS & WORD PROCESSING	H4 *David Farber* COMPUTERIZED MESSAGE SYSTEMS	H5-6 *Howard L. Morgan* WORD PROCESSING & OFFICE AUTOMATION	
SCIENCE AND TECHNOLOGY	I **COMPUTER & DATA BASE ARCHITECTURE** Georgian A, AM	I1 *Noah S. Prywes* IMPACT OF AUTO. OF SYST. DESIGN ON DATA BASE ARCHIT.	I2 *Liba Svobodova* COMPUTER STRUCTURE	● COMPUTER ARCHITECTURE ●			
				I3-4 *Yaohan Chu* HIGH LEVEL LANGUAGE COMPUTER ARCHITECTURE		I5 *Anne M. Gulick* MULTIPROCESSING	I6 *Tomlinson Rauscher* DEVEL. APPLIC. ORIENTED COMPUTER ARCHITECTURE
	J **SOFTWARE** Trianon, NYH	J1 *Margaret Butler* SOFTWARE SHARING	J2 *Alan G. Merten* TRANSFERABILITY OF APPLICATION PROGRAMS & DATA BASES	● SOFTWARE DESIGN & ENGINEERING ●			
				J3-4 *Edward Yourdon* STRUCTURED DESIGN		J5-6 *Raymond T. Yeh* SOFTWARE ENGINEERING — WHAT TO EXPECT IN THE NEXT DECADE	
	K **COMPUTER SCIENCE** Gramercy, NYH	K1-2 *Nathaniel Macon* COMPUTER ARITHMETIC AND NUMERICAL METHODS		K3 *James S. Ketchel* TECHNOLOGICAL FORECASTING	K4 *Joyce A. Amenta* SOFTWARE FOR SYSTEMS	K5-6 *Murray Turoff* IMPLEMENTATION OF COMPUTERIZED CONFERENCING SYSTEMS	
	L **APPLICATIONS OF COMPUTER SCIENCE** Royal A, AM	●		ARTIFICIAL INTELLIGENCE			●
		L1-2 *Saul Amarel & Edward Feigenbaum* APPLIC. OF ARTIFICIAL INTELL. TO SCIENCE & MEDICINE		L3-4 *Iris Kameny* INFERENCE SYSTEMS AND SPEECH RECOGNITION AND UNDERSTANDING		L5 *Marvin Minsky & Seymour Papert* ARTIFICIAL INTELLIGENCE & EDUCATION	L6 *Leonard Friedman* THE PRESENT AND FUTURE OF MOBILE ROBOTS

Replace your IBM 3270's and save up to 55%. Then…add online editing and validation to reduce mainframe load. Add disc storage for concurrent access of local files. Add COBOL for local processing of batch and transaction based applications. And still pay less than you would for an IBM 3270 Display System alone.

System IV/50: This is distributed processing.

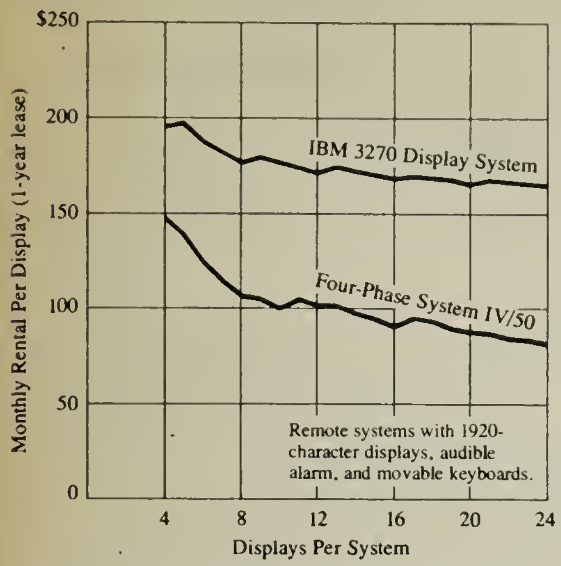
System IV/50 supports up to 48 devices including 24 1920-character displays plus a mix of character and line printers.

24K-96K byte CPU with 2.5M-270M bytes of optional disc storage.

System IV/50 displays can replace installed IBM 3270's with no change in existing cables or connectors.

See System IV/50 at NCC in Booth 2715.

Slash your 3270 monthly rental. Now.



If you're using IBM 3270's, System IV/50 will be an eye opener.

You can install it initially with immediate savings in monthly rental. Then make a smooth transition to distributed processing, fully preserving current network investment.

Field proven IBM compatibility.

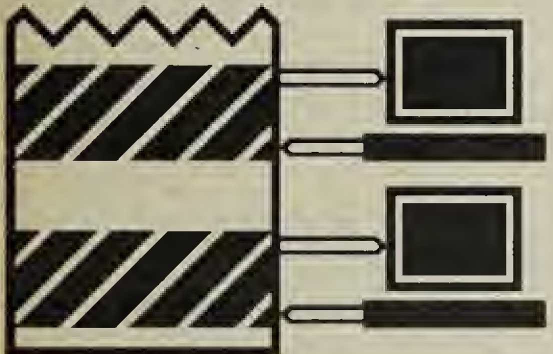
Switching to Four-Phase is easy. Because we're fully compatible with the IBM 3270—both local and remote.

Four-Phase 3270 replacements are online *now* with all System/370 models from the 135 to the 168. With DOS, OS, and VS. With CICS, IMS, and TSO. And with IBM ICA's, 2701's, 3704's, 3705's and their plug-compatible replacements.

Plus we're committed to support SDLC.

Advanced video architecture speeds program development.

System IV/50 programming is simplified by a display oriented architecture... and a COBOL compiler that makes the most of it.



Operator displays serve as windows into System IV/50 memory where screen data is stored. Data in these areas is displayed automatically and can be manipulated directly by COBOL procedure statements *without I/O transfers*.

Keystrokes are processed by software as they are entered, so editing and validation can be performed on a keystroke-by-keystroke basis.

Complementing this design is STARTER—a parameter driven formatting package that lets COBOL programmers write interactive applications as easily as batch.

With STARTER, formats are created off-line from the keyboard with free-form positioning of prompts, headings, and entry fields. Many basic edits are already built in.

As a result, format development, test, and modification are program independent.

Choose the optimum balance of central and local processing for each of your applications.

System IV/50 is supported by a wide spectrum of software for Network Transaction Processing. A choice of no-charge packages lets you grow at your own rate from remote data entry and display to remote data processing and remote data management... all on the same system.

At one end of the spectrum NTP/100 simulates the IBM 3270 with all transaction processing performed by the central mainframe.

At the other end of the spectrum NTP/200 supports stand-alone COBOL applications with all transaction processing performed by System IV/50.

Other NTP systems combine COBOL transaction processing with concurrent inquiry or batch communications.

Enhanced 3270 Simulator. NTP/100 provides all 3270 keyboard functions and editing features—plus local format storage for improved display response, a Store-and-Forward Mode for backup, and built in diagnostics to pinpoint network troubles quickly.

2780/3780 Simulator. NTP/130 is a programmable remote batch system that features disc spooling.

Programmable 3270 Simulator. With NTP/150 you get all the features of NTP/100—plus COBOL programming for custom enhancements. Use it to edit keyboard entries at the source, validate data against local system files, integrate data from these files with keyed entries for transmission... or with received data for display or printout, and to spool print files for increased operating flexibility.

Stand-alone COBOL. NTP/200 is a display oriented COBOL that lets you distribute processing power anywhere... without impacting your central operation.

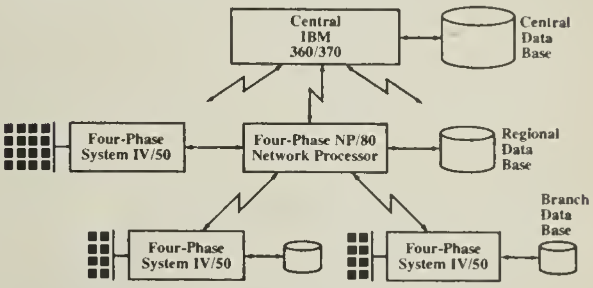
COBOL with 2780/3780 Access. NTP/230 is a display oriented COBOL with batch communications to your central mainframe or other remote systems.

COBOL with 3270 Access. NTP/250 is a display oriented COBOL that communicates with your central mainframe using IBM 3270 protocol... but without the restrictions and overhead associated with 3270 formatting and device dependent control logic.

Grow to hierarchical networks of any size or complexity.

Four-Phase's NP/80 Network Processor complements System IV/50 by meeting the communications and data base management requirements of large regional and district sites.

System IV/50 can access an NP/80 data base of up to 270 million bytes through direct channel connection. While communicating with your central mainframe at speeds up to 50K baud, the NP/80 can concurrently control a network of remote System IV/50's over multiple lines.



The heart of the NP/80 is a powerful computer with up to 256K bytes of LSI memory—*the first in the industry with 16K-bit RAM's*.

At Four-Phase we design and manufacture not only the displays and computers employed in System IV/50, but also the LSI devices used in it. Not because making semiconductors is our business. But because producing the most advanced distributed processing systems is.

To learn how System IV/50 can help your organization improve business efficiency and reduce operating costs, phone our local branch office today.

Atlanta	(404) 351-0070	Minneapolis	(612) 854-4461
Boston	(617) 245-9600	New Jersey	(201) 845-0252
Chicago	(312) 694-3250	New York	(212) 575-5656
Cincinnati	(513) 771-0670	Philadelphia	(609) 234-0200
Cleveland	(216) 661-0720	Pittsburgh	(412) 367-1860
Columbus	(614) 486-9546	Portland	(503) 224-3288
Dallas	(214) 634-2240	St. Louis	(314) 862-3030
Denver	(303) 321-0711	San Francisco	(415) 692-4360
Detroit	(313) 557-8844	Seattle	(206) 242-4800
Hartford	(203) 549-0054	Stamford	(203) 357-1860
Houston	(713) 777-0248	Washington	(202) 785-9222
Indianapolis	(317) 247-4743	Montreal	(514) 735-2217
Kansas City	(913) 384-0080	Ottawa	(613) 225-9030
Los Angeles	(213) 640-1438	Toronto	(416) 495-1300
Milwaukee	(414) 344-1417	Other Cities	(408) 255-0900

Four-Phase Systems

Advanced Technology for Distributed Processing

Four-Phase Systems, Inc., National Marketing Headquarters, 19333 Vallco Parkway, Cupertino, CA 95014
Yes, I want to know more about the new System IV/50.

Mainframe ______________ No. and type of terminals ______________

Name ______________ Title ______________

Company ______________

Address ______________

Telephone ______________ Ext. ______

City ______________ State ______________ Zip ______

Per Sci Drive Ready for Show

NEW YORK – The Model 270 dual diskette drive from Per Sci, Inc. will be exhibited at Booth 1642.

The 270 is fully IBM-compatible and can accommodate 3.8M bits of data per drive (1.9M bits on each diskette) in IBM 3740 format, the firm said.

In non-IBM hard- or soft-sectored formats, the drive will store up to 6.4M bits of data on two diskette media, it added.

The drive has a voice coil positioning system which the firm claimed can facilitate a random average seek in 33 msec.

The all-DC Model 270 is fully compatible with existing systems designed for stepper motors, Per Sci said.

The 270 is priced at $880 in 50-unit quantities, the firm said from 4087 Glencoe Ave., Marina Del Ray, Calif. 90291.

Peripherals at NCC

Gould Highlights Printer/Plotter

NEW YORK – Two products from Gould, Inc. – a wide-bed electrostatic printer/plotter and a portable data logger/reader – will debut at Booths 2813, 2815 and 2817.

The printer/plotter, the Gould 5105, features a writing system that produces high-density images and smooth line contours from computer-generated graphics and alphanumerics, the firm said.

The 5105 was designed for high-speed plotting of computer graphics in scientific and engineering applications such as seismic data recording, mapping, computer-aided design and architectural and engineering drawings, Gould said.

The unit can plot 22- by 34 in. in approximately 11 sec, it claimed.

The Gould 6100 data logger/reader collects, digitizes and stores low-frequency data on magnetic tape for subsequent processing.

Severe Environments

It was designed for use in severe environments such as those found in mobile, marine, airborne and field applications, the company noted.

The 6100 can accept two 8-channel scanner cards and has six scanning rates and five recording periods, Gould said. Options are available to increase the logger/recorder's capabilities and utility, the vendor added.

The Gould 5105 is priced at $15,500, the Gould 6100 has a base price of $3,750. Gould is at 3631 Perkins Ave., Cleveland, Ohio 44114.

Japanese Products Expected on Stage

NEW YORK – A variety of products ranging from card verifying punches to a high-speed multifax unit will be exhibited by the Japanese firm, Tokyo Juki Industrial Co., Ltd., at Booth 3240.

The Model 1504 card verifying punch, which can punch, verify, print and interpret, and the Model 1504-AP card verifying punch with aperture card features will be shown.

Two dot matrix printers, the 5701 and 5703 will also be displayed. The 5701 has a single head, the 5703 a dual head.

The firm will also show a card reader, the Model 2603-RJ, which reads punch and mark cards and is equipped with a Miss-Card Reject Feature.

Other products will include the Model 3001 photoengraver, which engraves portraits on plastic cards; the Model 1820 data recorder; the Model 1830, a disk-tape data converting adapter; and the Model 100-A, a high-speed multifax or radio facsimile equipped with band compression modem FAM-1, the company said.

Tokyo Juki is at 23 Kabuki-cho, Shinjuku-Ku, Tokyo, Japan.

Voice Response Units To Be Demonstrated

NEW YORK – The Vocal Interface Division of Federal Screw Works will show several of its Votrac voice response units at Booths 3327 and 3329.

One will be the LV-50 voice annunciator, which uses the Vodis-1 computer system to convert analog audio signals into digital bit patterns.

The low data requirement of this process permits the use of programmable read-only memories as storage media, the vendor said. This in turn could allow the use of solid-state digitally stored vocabulary by users with a low volume of changing vocabulary requirements, it added.

In addition to English, the ML-1 multilingual voice system to be displayed can speak German. Other languages, such as Spanish, French, Japanese and Persian, are presently under consideration for development, the firm said.

The ML-1 is programmed to speak based on phonetic coding principles; utterances are spelled phonetically to produce all combinations of words and phrases required by the application, the company said, adding there is no limit to the amount of vocabulary the ML-1 can produce.

The company is at 270 Concord St., Framingham, Mass. 01701.

Storage Units in Limelight

NEW YORK – National Semiconductor Corp. will display three memory storage products at its exhibit in Booth 3220.

The products are the NS21 memory storage card with a 16K-word memory; the NS3000-1 memory card, also with a 16K-word memory; and the NS3 bulk storage memory unit with a capacity of 256K bytes.

National Semi is located at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Tape Message Displays Set

NEW YORK – Texas Digital Systems, Inc. will exhibit its tape message display units at Booth 2106.

The display units have 16-character message formats with programmable blink capability and a 64-character alphanumeric set, Texas Digital said.

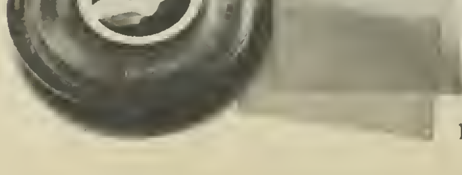
The company can be reached through P.O. Box 3701, Bryan, Texas 77801.

A micro-size message from Rodney Dangerfield

I tell you, I always had respect for computers! But now I got respect for 3M COM! Look at this! Totally dry COM on one side...low-cost COM graphics on the other! Nobody else has got either one! 3M must be driving their competitors nuts!

Want the convenience of COM right in your computer room? Get 3M LBR, the only totally dry COM. No liquids, no chemicals because LBR uses amazing laser beam technology.

Want pie charts, bar charts, and graphics on microfilm—to make data easier to understand and decisions easier to make? Get a 3M Beta System. It's the only low-cost COM with built-in graphic capability.



Want COM that converts print tapes to microfilm without heavy programming? 3M's mini-computer-controlled Beta System offers that, too. Conversion is easily accomplished, with simple operator-entered job parameters. Find out more. Write Microfilm Products Division, 3M Company, St. Paul, MN 55101 for full details on LBR and Beta COM—and 3M's full range of software and support services.

3M COMPANY

NEW PTS/1200 PROCESSING SYSTEM GRANTS "SIX FREEDOMS" TO REMOTE SITES.

GET THE GOOD WORD.

Raytheon's new PTS/1200 distributed processing system gives companies with extensive branch operations new independence from centralized information handling.

The versatile, cost-effective PTS/1200 system allows remote sites to perform their own:

- source data entry and pre-processing, including editing and validating;
- file and record maintenance — creating, accessing and updating locally stored data;
- unattended two-way communications, either in point-to-point or multi-point networks;
- stand-alone batch processing — and disc storage up to 20 million bytes of capacity;
- fast, flexible report printing, in many formats;
- 3270 terminal emulation on-line with 360/370 computers.

Ready-to-use software gets your data up fast — and you can program your own applications easily. The system can utilize up to 24 terminals simultaneously. It reduces computer line costs and forms costs, expedites data retrieval and reports, improves productivity and requires minimal operator training.

A demonstration says it all.

To arrange that, write to Raytheon Data Systems, Marketing Department, 1415 Boston-Providence Turnpike, Norwood, MA 02062 — or telephone 800-225-9874 (toll-free). When you build better information processing systems . . . **the Word gets around.**

INTELLIGENT TERMINALS, MINICOMPUTERS AND TELECOMMUNICATIONS SYSTEMS

RAYTHEON DATA SYSTEMS RAYTHEON

Interdyne Starting Family

NEW YORK – The Interdyne Co. will introduce the IC 1300, the first model in its Unireel family of digital recorders, to NCC attendees at Booth 2635.

The Unireel concept combines a single-reel magnetic tape package that is smaller than cassettes or cartridges with a small, self-threading tape drive, the company said.

The Unireel 150, a package of tape has a 2-1/8 in. diameter, weighs 1 oz and contains 140K bytes of information, Interdyne said.

Unireel 150s are loaded into the Unireel 1300 tape drive with a straight line "slot-loading" motion; the drive automatically threads the tape into a captive takeup reel and positions the tape, the company added.

Prices and delivery dates have yet to be announced by the firm at 14761 Califa St., Van Nuys, Calif. 91411.

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Starvvue Also on View

Oracle to Appear at Kodak Exhibit

NEW YORK – Eastman Kodak Co.'s recently introduced Oracle microfilmer and retrieval terminal and Starvue reader and reader/printer will highlight its exhibit at Booth 2132.

The company will also display three other products: the KOM-80 microfilmer, the Recordak Reliant 700 microfilmer and the Ektalite 234 reader.

The Oracle microfilmer and retrieval terminal provides random access of documents by means of a digital code exposed on the film.

It was designed "for microfilm applications where complex coding is not required, but where rapid selective retrieval is necessary for business efficiency," Kodak said.

The Oracle has the capability to directly access film encoded with an 8-digit code at the base of the document image, the company added.

The Starvue reader and reader/printers were designed to handle varying film requirements and reduction ratios, Kodak said.

Eastman Kodak is at 343 State St., Rochester, N.Y. 14650.

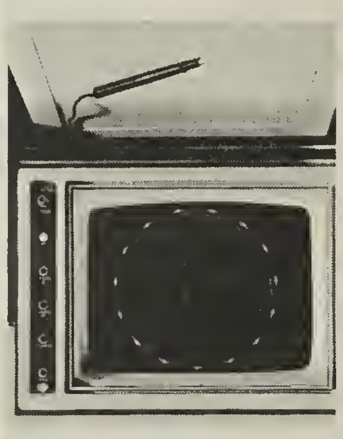
Megatek Graphics Generator to Bow

NEW YORK – Megatek Corp. will introduce the 76X graphics generator, said to be capable of refreshing over 4,000 vectors, points or characters with full-screen resolution of ±.05% at Booths 1807 and 1809.

The unit refreshes from internal memory to eliminate CPU loading, the company said.

Features of the 76X include dynamic graphic capabilities, real-time clock, hardware jump-subroutine and relative vectors; 16 levels of intensity control; Ascii keyboard; translation; and rotation, it added.

The 76X is priced "under $8,000," according to Megatek, which is at 1055 Shafter St., San Diego, Calif. 92106.



Megatek 76X

Peripherals at NCC

Okidata Putting Printers on Display

NEW YORK – Okidata Corp. will be demonstrating both its 132-column printer and its document/passbook printer at Booth 2301.

The 132-column matrix printer, which sells for $1,700, comes in either desk-top or pedestal-mounted versions and produces 5 by 7 matrix characters at 125 line/min or 265 char./sec, Okidata said.

It is available with parallel and RS-232 serial interfaces, the firm said.

The printer features an Ascii character set, full upper- and lower-case characters and 6- or 8 line/in. operation.

The CP210 document/passbook printer, which prints 65 line/min, was designed for remote terminal systems.

Featuring upper- and lower-case characters, the CP210 is configured for shared use by two operators with separate controls for each, the firm said.

Okidata is at 111 Gaither Drive, Moorestown, N.J. 08057.

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NEW YORK – Mason/Charter Publishers, Inc. will show its *Encyclopedia of Computer Science* in Booth 2017.

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Peripherals at NCC

Source 7600 Device to Make Appearance at MSI Booth

NEW YORK – The Source 7600, a programmable, off-line data terminal, will highlight MSI Data Corp.'s exhibit at Booth 1717.

MSI Source 7600 Terminal

The source data entry workstation interfaces with either in-house or contracted computer service centers and approaches the input/output performance of on-site minicomputer systems, remote batch terminals and other on-line data input terminals, MSI said.

The terminal incorporates an Intel 8080 microprocessor which is permanently programmed with a full set of basic programming commands, according to the firm.

'Free Form' Mode

A "free form" mode also allows the terminal to accept and then transmit narrative, unformatted data, the company added.

One cassette drive is standard with the terminal; a second is optional. The 7600 includes a full typewriter keyboard, a separate accounting-style 10-key touchpad and a 32-position LED display that permits the operator to edit each line of data while it is still buffered, MSI said.

Source 7600 inputs are received at the computer center by MSI's Data System IV, which records all inputs on magnetic tape for subsequent input into the host CPU, according to the company.

The terminal is priced from $3,500 to $4,500, depending upon options. MSI is at 340 Fischer Ave., Costa Mesa, Calif. 92627.

Intelligent Digitizer on View

NEW YORK – The Intelligent Digitizer, which features a built-in microprocessor, will be shown by Summagraphics Corp. in Booth 1826.

The unit is self-calibrating and all modes – point, stream and remote – may be operated incrementally; that is, X-Y data is output only when the value changes.

The microprocessor allows stand-alone operation of the Intelligent Digitizer, which also features a front panel switch that permits user selection of origin anywhere on the tablet surface, the vendor said.

Interfaces are available to link the digitizer with minicomputers, calculators, communications devices, keypunches and magnetic tape transports, Summagraphics said.

The company is at 35 Brentwood Ave., Fairfield, Conn. 06430.

ITC Announces Entry Of Three Cassettes

NEW YORK – Information Terminals Corp. (ITC) will introduce three products at Booths 3519 and 3521.

The H Series of high-reliability cassettes is certified to be dropout-free and operates over a temperature range of -50°F to 150°F, ITC said.

The MI-50 mini cassette was designed for applications such as microprocessor program loading, word processing, minicomputer storage and hand-held terminals. Each cassette is priced at $6 in quantities of 100.

The TK-100 cassette test kit provides an aid in aligning cassette transports, measuring tape tension and cassette torques. It can be used with any Philips-compatible cassette, ITC said, and costs $1,050.

ITC is at 323 Soquel Way, Sunnyvale, Calif. 94068.

Danish Company Displaying Tape Punch, Reader Line

NEW YORK – GNT Automatic, Inc., a Danish firm, will display its line of paper tape punches and readers and introduce two products at Booth 3114.

Included in the exhibit will be the paper and Mylar tape models 3406 and 3424 punch stations, the table-top Model 34 punch, the Model 34T punch mechanism, the Model 42 reader/punch combination and the complete Model 26 reader program.

The Model 3406 punch and Model 26CI reader will be introduced. The 26CI is a unidirectional 550 char./sec reader, primarily intended for use as an input device for minicomputers.

The 3406 utilizes a spooling system which allows the tape to wind itself automatically.

GNT Automatic can be reached at 440 Totten Pond Road, Waltham, Mass. 02154.

Diagnostic Instrument Bows

NEW YORK – Vu-Data Corp. will introduce its Model PS915/975, a digital multimeter, frequency counter and oscilloscope in a single unit with its own displays, at Booth 2019.

The diagnostic instrument is priced at $1,250 from the company at 7170 Convoy Court, San Diego, Calif. 92111.

Deltak Showing Courses

NEW YORK – Deltak, Inc.'s multimedia training courses on subjects such as TSO, IMS, PL/I, structured programming and structured design will be on display in Booth 3400.

Deltak is at 9950 W. Lawrence Ave., Schiller Park, Ill.

How Gordons Transports Keeps On Trucking To Atlanta:

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Emerson Planning Demonstration Of Series 2000 Tape Pac System

NEW YORK – The Industrial Controls Division of Emerson Electric Co. will demonstrate the Series 2000 Tape Pac system at Booths 1218 and 1220.

The Series 2000 is a magnetic tape system that is said to offer improved tape handling and media protection.

Standard System

The standard Tape Pac system consists of a Model 2005 tape drive and a Model 2004 Tape Pac; the system is plug-compatible with conventional tape drives using standard tape formatters, Emerson said.

Speeds and Densities

The tape drive has a read/write speed of 25 in./sec and recording densities from 200- to 3,200 bit/in. according to the firm at 3300 S. Standard St., P.O. Box 1679, Santa Ana, Calif. 92702.

Taurus to Exhibit Heavy-Duty Readers

NEW YORK – Taurus Corp. will exhibit its line of heavy-duty industrial serial and static punched card readers at Booth 1815.

The serial card reader that will be featured has 168 options available and can be either cabinet- or rack-mounted.

The static card readers came in three sizes: 20-column, 40-column and 80-column.

Taurus is at Academy Hill, Lambertville, N.J. 08530.

Spatial Eying Meet With Image Station

NEW YORK – Spatial Data Systems, Inc. will demonstrate its digital image analyzer, the Computer Eye Image Station, at Booth 1111.

The digital picture processing terminal is said to enhance and measure aerial photographs, radiographs and microscope images as well as standard photos.

Can Act as Terminal

The Image Station provides stand-alone capabilities and also can act as an intelligent terminal to larger host computers, according to the company.

The cost of the device ranges from $20,000 to $75,000, the company said from P.O. Box 249, 508 S. Fairview, Goleta, Calif. 93017.

Peripherals at NCC

Voice Data Entry Unit Starred by Threshold

NEW YORK – A data entry terminal that recognizes spoken words will be displayed by Threshold Technology, Inc. (TTI) at Booth 1013.

The Threshold 500 recognizes spoken words and can be used to replace or complement CRT/keyboard stations, the firm said.

Output from the unit is in the same format and code as that of a standard keyboard terminal, TTI added, noting it can be used with the firm's 550 central processor in turnkey systems.

The Threshold 500 is priced at $10,500, the company said from 1829 Underwood Blvd., Delran, N.J. 08075.

General Instrument Presents Disk Memory

NEW YORK – Head-per-track disk memories will highlight General Instrument Corp.'s exhibit at Booth 1433.

The company will show its latest memory, the Model 530C, which was designed for random-access storage.

The Series 700 random-access disk drive, which will also be displayed, has a storage capacity up to 4.5M bits.

General instrument is at 13040 S. Cerise Ave., Hawthorne, Calif. 90250.

Paper Tape Punch Model Comes Out at Epson Booth

NEW YORK – Epson America, Inc. will introduce the Model 6110 paper tape punch, which operates at a speed of 50 char./sec, at Booths 1128 and 1130.

The 6110 is said to be adjustable to accommodate 5, 6 or 8 channels of 1-in. Ansi standard tape.

Epson, located at 2990 W. Lomita Blvd. in Torrance, Calif. 90505, will also demonstrate a companion 6510 paper tape reader and a card reader, line printer, micro drum memory and mini printers for use with calculators.

Graf/Pen Series Introduced

NEW YORK – Another series of Graf/Pen digitizers will be introduced by Science Accessories Corp. (SAC) in Booths 1803 and 1805.

The NT series uses pulses of sound to convert point locations or graphic line representations into digital information for data processing, recording or transmission, SAC explained.

The sonic pulses are generated by a pen, stylus or cursor in the system.

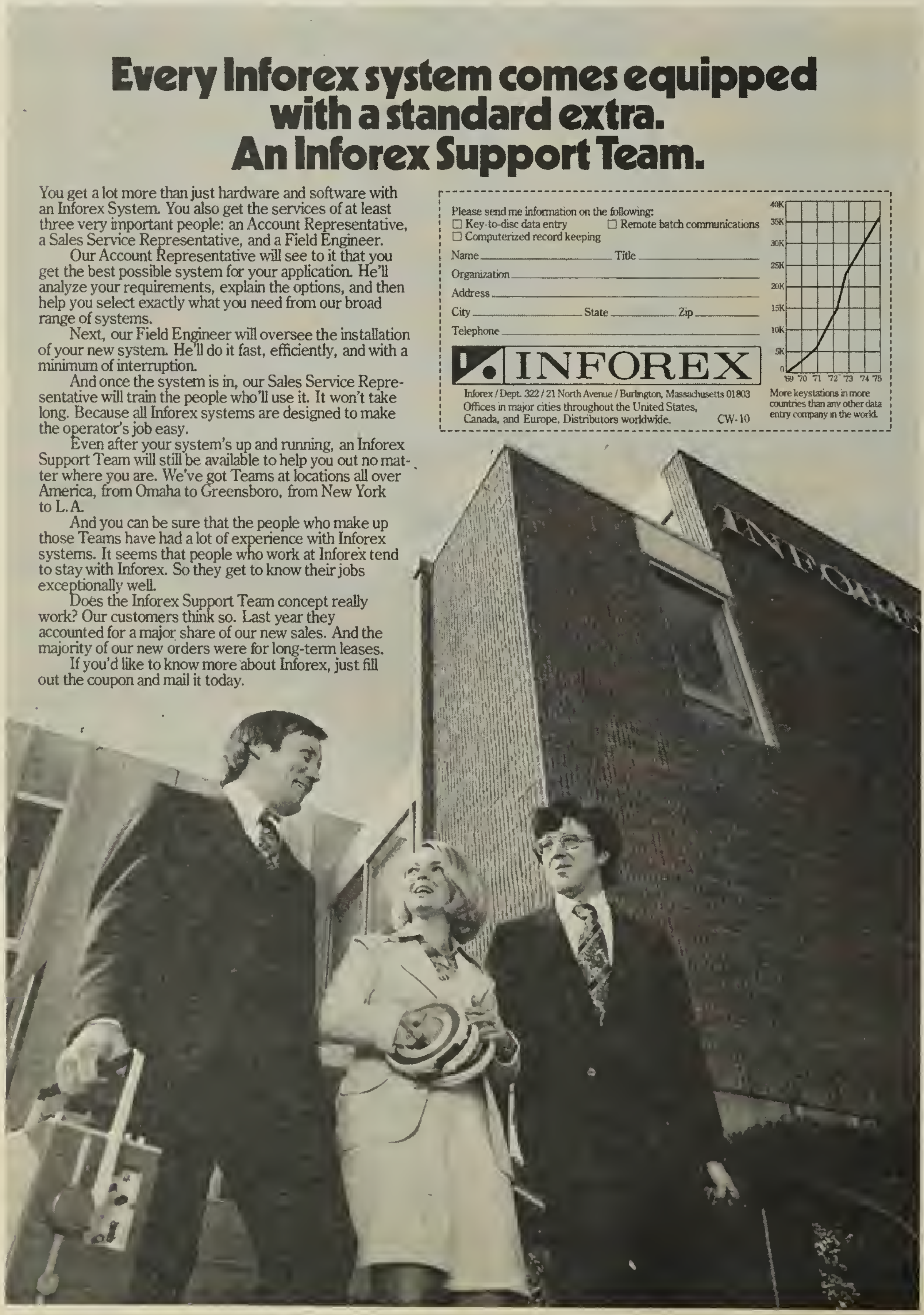
By measuring the time required for the pulses to reach two microphone/sensors, the distance of the point from each of the two sensors can be determined, SAC noted from 970 Kings Highway West, Southport, Conn. 06490.

Paper Tape Transport Bows

NEW YORK – Data Specialities, Inc. will introduce the Moduperf 75 paper tape transport that is said to offer field-replaceable modules so the operator can replace the die block and/or data selector.

The die block cuts holes for a minimum of 120 million punch cycles or 1,000 rolls of tape, the vendor said, and will punch all types of tape including Mylar, paper, oiled, folded or rolled.

The Moduperf 75 will be shown in Booth 2117, Data Specialties said from 3455 Commercial Ave., Northbrook, Ill. 60062.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System 1200 to Highlight MDS Display

NEW YORK – Mohawk Data Sciences Corp. (MDS) will demonstrate several products, including its System 1200 key-to-disk unit and System 2300 Hasp workstation, hourly at Booths 3321, 3323 and 3325.

Multiplexer Included

The System 1200 is a data entry system built around the 1204 control unit, which contains a processor, fixed-disk storage drive with controller, 32K memory, a 1/2-in. magnetic tape drive with controller; and a Keystation multiplexer.

The 2300 Hasp workstation has a 400 card/min reader and a 30 char./sec bidirectional printer featuring electronic skipping and tabbing, MDS said.

Also demonstrated will be the concurrent capabilities of the MDS System 1200. As operators enter information under control of the key-to-disk operating system, the System 2300 intellignet terminal will transmit remotely prepared transaction files to the 1200 for incorporation into the main processing stream, MDS said.

Peripherals at NCC

SIP to Be Shown

The company's user programmability language, SIP, will also be demonstrated. SIP allows key-to-disk users to tailor their own validation and edit routines to complement the ready-to-use software features supplied by MDS, it said.

The firm is located at 1599 Littleton Road, Parsippany, N.J. 07054.

Ampex Drive Ready For First Showing

NEW YORK – Ampex Corp.'s DM-9300, a 300M-byte model in its 9000 family of disk drives, will be demonstrated for the first time at Booth 3200, along with the DM-900 Quiet Enclosure designed for business environment operations.

The firm will exhibit its entire family of mass storage disks from 40M- to 30M bytes, all using common interfaces, a spokesman said.

"We will emphasize to OEM users that the flexibility of these field-upgradable disk drives means increased return on their investments," he added.

The DM-9300 is scheduled for mid-year delivery from the firm at 401 Broadway, Redwood City, Calif. 94063.

Tab to Feature Micro-Equipped Punch-Verifier

NEW YORK – The Model 501 microprocessor-equipped punch-verifier from Tab Products Co. will be demonstrated in various modes at Booths 2707, 2709 and 2711.

The interpreting punch-verifier was designed for 80-column card applications; it is fully buffered and has chained program selectivity, memory storage for constant data and check-digit accumulate and computation functions, Tab said.

With the addition of communications interfaces, the 501 can be switched on-line to provide punched card I/O capability, the company added.

The Model 501 can be purchased or leased under various plans. A unit with interface and maintenance costs about $8,250 or $266/mo, Tab said from 1451 California Ave., P.O. Box 10269, Palo Alto, Calif. 94303.

SMS Bringing Along Tape Label Printer

NEW YORK – An automatic label printer for computer tapes that prints at 20 labels/min will be shown in Booth 3117 by Scientific Measurement Systems, Inc. (SMS).

Information is printed on the label whenever a dismount message occurs for a newly created output tape, SMS said.

Types of Information

The information consists of such data as customer identification, volume serial number, job name, step name, date created, data set name, tape drive address, label type, sequence number, density and other customer information.

The unit can be used with IBM 360/370 systems, SMS said from 26 Olney Ave., Cherry Hill, N.J. 08003.

Texwipe Scanning Magnifier Checks Disk Pack Surfaces

NEW YORK – The happenings at The Texwipe Co.'s Booth 1224 will include the introduction of an optical scanning magnifier and the demonstration of contamination control supplies for computers and peripheral equipment.

The optical scanning magnifier was designed to check the surface condition of disk packs and can be added to the company's System 316 and System 336 disk pack inspection equipment at no additional cost.

The systems cost $1,995, a Texwipe spokesman said. The company can be reached through P.O. Box 278, Hillsdale, N.J. 07642.

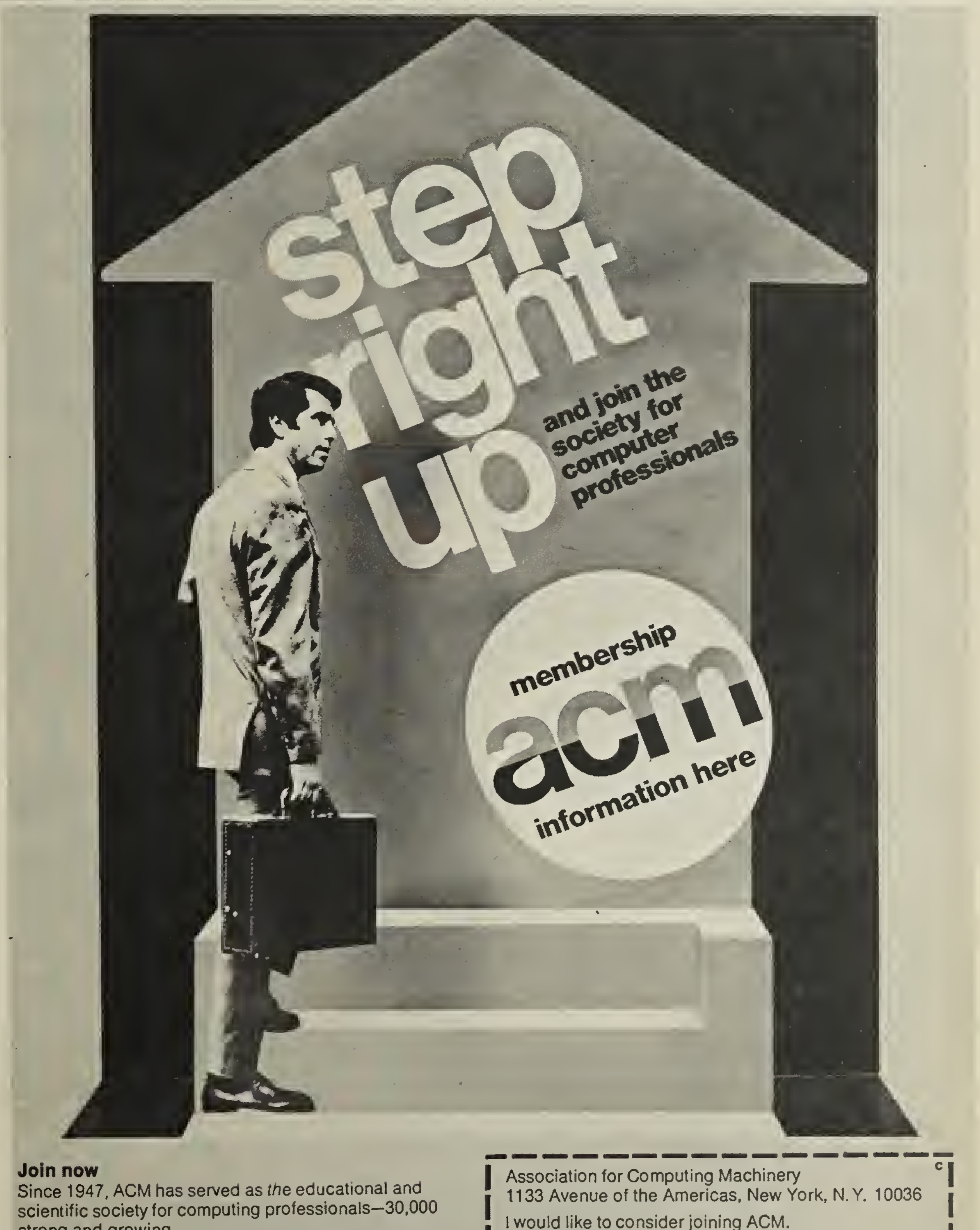
Glaser Plotter Coming

NEW YORK – A flat bed plotter and a line of plotters compatible with the Hewlett-Packard 9830 calculators will be introduced at Booth 2122 by Glaser Data Co.

The plotters accept Ascii signals; an RS-232 interface is standard, but a range of optional interfaces is available, the firm said.

The Model DP-1700 flat bed plotter offers a 44-in. by 34-in. plotting surface and has a speed of 800 increment/sec for a price of $17,000, the firm said.

Glaser is at 225 Forest Ave., Palo Alto, Calif. 94301.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Terminals at NCC

At Booths 1122 and 1124

Datamedia Scheduling Display of Three Elite Units

NEW YORK – The Elite line of portable CRT terminals will be shown by Datamedia Corp. at Booths 1122 and 1124.

Datamedia Elite Terminal

The three models in the Elite series have a 9-in. diagonal display and a built-in 300 bit/sec coupler option, the company said.

The basic model provides a "glass Teletype capability," the mid-range unit features cursor addressability and optional lower case and the top-of-the-line version provides APL/Ascii capability.

The Elite 1520A has the ability to display 1,920 alphanumeric characters in a 24-line by 80-character format; a 64-character Ascii set; and an optional APL/Ascii switch-selectable capability, Datamedia said.

It was designed for interactive applications, data entry and information retrieval and can accommodate a standard RS-232C or optional 20/60mA current loop interface, the firm added.

The APL/Ascii Elite 1520A video terminal has a standard 128-character upper- and lower-case Ascii set and APL switch capability, the company said.

The Elite 2500A CRT terminal features a full upper- and lower-case character set and a display format of 1,920 characters.

"One of the more salient features" of the Elite 2500A, the company claimed, is its format mode capability – a dual-density display which distinguishes between foreground and background data. A "blink field" can be used to highlight important data.

Prices range from $1,250 to $1,664 for the terminals; Datamedia is at 7300 N. Crescent Blvd., Pennsauken, N.J. 08110.

DTC to Show Disk, Hywriter, Terminal

NEW YORK – The DTC-300/S terminal, the DTC-302 Hywriter and the DTC Micro File intelligent disk system will be demonstrated by Data Terminals and Communications (DTC) in Booth 3529.

The DTC-302 utilizes the Diablo Hytype 1 printer and a microprocessor controller. It comes in either desktop or pedestal-mounted versions.

Capable of print speeds of 45 char./sec, the DTC-302 can operate at optional data rates up to 1,200 bit/sec for a price of $3,490.

The Micro File system provides users of any RS-232-compatible data terminal with the capability to make the unit a stand-alone or remote terminal.

The unit includes a dual floppy disk drive, 8K characters of random-access memory and a dual RS-232 interface and costs $3,950.

DTC is at 1190 Dell Ave., Campbell, Calif. 95008.

Portable CRT Exhibit Feature at ASC Booth

NEW YORK – Applied Systems Corp. (ASC) will show its portable CRT communications terminal at Booth 2100.

Options are available for function electronics and a microprocessor to transform the CRT into an intelligent terminal for formatting, editing and special communications protocols, ASC said.

The unit features a 64-character, standard upper-case Ascii keyboard with an optional numeric pad; the CRT has a 256-character display in an 8-line by 32-character format.

The unit is capable of transmission speeds of 110- and 300 bit/sec, with optional speeds up to 9,600 bit/sec, ASC said from 26401 Harper Ave., St. Clair Shores, Mich. 48081.

Intertec Planning to Unveil Data-Term Devices for OEMs

NEW YORK – Intertec Data Systems Corp. will introduce its Data-Term data communications terminal for the OEM market at Booth 2807.

As standard features, the terminal includes impact printing in a 132-column width, 45 char./sec operation, 30-key alphanumeric keypad, horizontal and vertical tabs and a user-programmable character set, Intertec said.

Optional features include an APL/Ascii character set; IBM 2740 and 2741 compatibility; Intertec's micro cassette; and print speeds up to 180 char./sec.

The unit is priced at $1,300 in OEM quantities, Intertec said from 1851 Interstate 85 South, Charlotte, N.C. 28208.

Data-Term 450

The reach for speech, and other important topics in *Source Data Entry.*

A special report in the June 28th *Computerworld.*

Computers can process only the data they have access to. And the speed of your entire computer operation is necessarily dependant upon how fast you convert raw data to machine-readable form. That's why the data entry function has been the target of so many economizing measures over the years. And we've come a long way from the card and keypunch sweat shop environments of ten years ago. Key entry is no longer widely viewed as a purely clerical function for control clerks to balance or correct at a later time. Now there's a variety of systems that enable an operator to enter data, edit and validate it automatically, transmit it to the host computer and then receive the interpreted data, all with the same equipment. And we'll look at how organizations are using systems like these to increase the economy and utility of their computer operations.

Using application stories and tutorials, we'll cover the entire range of data entry, including traditional keypunch to 80- and 96- column cards, as well as key-to-tape and the much-heralded key-to-disk systems. We'll focus on the many options available in mixed media systems - with combinations like OCR and keypunch, for example. Distributed data entry has been praised by some users as "the wave of the future", and we'll cover this subject in depth.

And what's left after card, tape, disk, buffered, distributed, hybrid and OCR? Possibly Voice Data Entry, which could develop into one of the most revolutionary innovations we've seen so far. We'll emphasize user experiences with these products, and we'll analyze the incredible convenience they can bring to many applications, as well as what problems must be overcome.

In all, you'll find in-depth summary of what's being done in the eminently practical field of source data entry. And if you have an interest in data entry methods you should be reading this special supplement in the June 28th *Computerworld*. If you're a marketer in this field, here's where you should be telling your story. Ad closing date is June 11. Contact your *Computerworld* salesman for complete details. Or call Judy Milford at (617) 965-5800.

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Harris Bringing Enhancements For 1600 Remote Processors

NEW YORK – Harris Corp.'s Data Communications Division will have a series of hardware and software enhancements to its 1600 family of remote communications processors at Booth 2217.

The firm's disk-based Extended Communications Operating System (Ecos) employs an architecture similar to the multiprogram operating system in mainframes, Harris said.

With Ecos, a user can operate in a multijob, multitask environment while performing data entry, remote batch, file manipulation, media conversion and local batch processing on the 1600, the firm noted.

Also featured will be the Local Batch Processing system that enables users to perform batch processing functions at the 1600 site with programs written in Cobol, Harris said.

The Key Entry Processing (KEP) system also on display allows both local and remote data entry, file update and file manipulation to be implemented through the Model 1675 CRT entry station, the firm said.

Also demonstrated will be a Remote Generalized Application Language (Regal), developed to support the KEP. Regal is said to permit the user to create his own key entry programs for source data entry, file manipulation and update.

A line of products for communications network control will also be shown, the firm said from P.O. Box 44076, Dallas, Texas 75234.

Terminals at NCC

Delta 4700 Making Its First Appearance

NEW YORK – An intelligent display and storage system which includes a video display terminal and a floppy disk system will be shown for the first time by Delta Systems Corp. at Booths 2631 and 2633.

The Delta 4700 has up to 16K bytes of read/write memory and is programmable from the keyboard, the company said.

Standard features include a keyboard with a set of programmable function keys; upper- and lower-case display; and the ability to display a variety of special symbols.

The system incorporates the Delta 4500, a floppy disk system which it claimed can contain up to six drives.

A single-drive Delta 4700 costs $3,100; the display terminal and floppy disk are also available separately, Delta noted from Woodhaven Industrial Park, Cornwells Heights, Pa. 19020.

AGI Plans to Display Additions to AG 910

NEW YORK – Three terminals will be introduced by Applications Group, Inc. (AGI) at Booth 2127.

The AG 90 features a typewriter-style keyboard and was designed primarily for use in two-way communications between two individuals or between an individual and a computer, AGI said.

AG 90 From AGI

The AG 91 features a standard teletypewriter keyboard and can be used as direct replacement for a teletypewriter, the company said.

Data communications and graphics capabilities are included with the AG 95. This unit has a character set of 64 teletypewriter characters.

Each of the three units is priced at approximately $2,000. The company can be reached through P.O. Box 444, Maumee, Ohio 43537.

AJ Display Varied

NEW YORK – Anderson Jacobson, Inc. (AJ) will be exhibiting a number of its keyboard printer terminals, editing recorders, couplers and acoustic couplers at Booths 1212 and 1214.

The company will have its AJ 832 keyboard printer on hand. The unit features selectable data rates of 10-, 15- and 30 char./sec and plotting and forms handling, AJ said.

Other products out for attendee's viewing will be the AJ 630, 841 and 730 terminals; the AJ 242 coupler; and three models of acoustic couplers.

The AJ 832 is priced at $3,750; the 630 costs $2,895; and the AJ 841 is priced at $2,995 new and $995 used.

AJ is at 1065 Morse Ave., Sunnyvale, Calif. 94086.

Informer to Unveil Portable Display Unit

NEW YORK – A portable display terminal from Informer, Inc. will debut Booths 2000 and 2002.

The terminal is an addition to the vendor's P Series of portable video display terminals. This and other terminals in the line can be equipped with an RS-232 interface with the capability of sending and receiving data at rates up to 9,600 bits/sec or with a 300 bit/sec acoustic coupler, Informer said.

Pollable Unit Too

Also available from Informer is a pollable, daisy-chainable portable unit.

The company will also display its small, lightweight standard unit with a full-size keyboard and 512-character display.

The latest P Series terminal is available from the vendor at 2218 Cotner Ave., Los Angeles, Calif. 90064 for $2,080.

$4,500 worth of multi part burster for $2,995!

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With Varied Exhibit

Data 100 Aims at OEMs, End Users

NEW YORK – Products for both end users and OEMs will be exhibited by Data 100 Corp. at Booth 2327.

End-user products will include the Model 77 remote entry system, which was designed to provide remote entry and communications capabilities for remote processing applications, the company said.

The Model 77 uses a flexible disk storage medium and allows the user to enter, edit and store data on diskette under the control of data entry software, Data 100 added.

The unit permits the operator to enter data under the control of prewritten input formats, which establishes central control of data for a network of several remote entry systems, according to the vendor.

The user also has the option of creating and maintaining application formats directly on the system, the firm added.

Other Products

Other end-user products shown will include the Model 74 distributed processing system and the Model 76 remote batch terminal.

Data 100's OEM Division will show a selection of line printers, cartridge disk drives, card readers, card punches and paper tape products.

The firm can be reached through P.O. Box 1222, Minneapolis, Minn. 55440.

Quatro Slates Micro-Based Units

NEW YORK – A series of small, lightweight microprocessor-based magnetic card terminals, capable of sending or receiving data in synchronous or asynchronous mode, will be introduced to the U.S. market by Quatro, Inc., in Booths 2026-2028.

Designed and developed by SKS of Karlsruhe, West Germany, the units are available in five configurations, ranging from a basic read-only unit to one with five function keys, a 10-digit numeric keyboard, an eight-digit LED display and a 16-digit numeric impact printer.

Prices in OEM quantities range from $1,600 to $2,400, FOB Germany, depending on configuration. Quatro, the U.S. marketer, is at 3 Great Meadow Lane, East Hanover, N.J. 07936.

Forms-Handling Units Presented by BDT

NEW YORK – West Germany will be represented by BDT Buro-und Datentechnik GmbH, which will show forms-handling devices from its product line at Booths 3305 and 3307.

Three front-feeder devices will be shown: The FF 70, FF 100 and FF 120. These provide the capability to process cut single forms and/or multiple-part form sets on all types of serial printers, BDT said.

The front feeders can be used in conjunction with BDT's FT 212 forms tractor, which will also be shown. Used together, the two units can provide the forms-handling capability for both continuous and individual forms on the same printer, BDT said.

BDT is at P.O. Box 80, D-7210 Rottweil, West Germany.

ASC Set to Display Intelligent Device

NEW YORK – At Booth 2100 Applied Systems Corp. (ASC) will display its ASC Portable Intelligent Terminal with an integrated microprocssor.

The terminal features a standard uppercase Ascii keyboard, a neon-orange alphanumeric plasma display with 256 characters in eight lines of 32 characters each, the firm said.

Terminals at NCC

The terminal uses a standard acoustic coupler, operates in full-duplex, half-duplex or local modes at speeds of 110- or 300 bit/sec. Options to 9,600 bit/sec are available, ASC said from 26401 Harper Ave., St. Clair Shores, Mich. 48081.

Graphics Display Family To Debut at Lundy Booth

NEW YORK – Lundy Electrononics & Systems will show the first member in its GD family of graphic displays at Booths 3013 and 3015.

The LGD-200 is a high-performance random scan refresh system. The system includes hardware vector and character generator that yields 9,000 characters and 8,000 in. of 2-in. vectors flicker-free; 4K by 4K addressable locations; 8K by 16 bits of self-contained buffer memory; and 220 sq. in. of usable display area, the firm claimed.

The system is priced under $40,000 Lundy said from 1 Robert Lane, Glen Head, N.Y. 11545.

RCA Showing Three Products

NEW YORK – RCA Service Co. will occupy Booth 1006 with demonstrations of the GE Terminet 30 terminal with magnetic tape; the Extel receive-only teleprinter; and the Model 33 automatic send/receive teleprinter, all of which are leased and serviced by the firm.

RCA Service Co. is in Camden, N.J. 08101.

GE Printers in Spotlight

NEW YORK – General Electric will show its Terminet 30 matrix printers and the Terminet 340 line printer and other products in Booths 3118, 3120 and 3122.

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How smart is smart? The answer is simple.

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And smart. System 70 is IBM 3780 or teletypewriter compatible. It has single or dual

Miniworld at NCC

Datapacer on Show

NEW YORK – Tennecomp Systems, Inc. will show its Digital Equipment Corp. PDP-8- and PDP-11-compatible Datapacer cartridge tape system at Booth 1216.

The Datapacer is said to feature a 3M Co. DC300A data cartridge which has a storage capacity of up to 2.8M bytes on a four-track cartridge.

The read/write speed of the tape system is 30 in./sec; the search speed is 90 in./sec operating bidirectionally, according to the company.

Base prices for single-track and four-track models are $2,980 and $3,490, respectively, and include a software package with load and dump routines, DEC operating system drivers, Tennecomp interpretive language I/O library routines and diagnostics, the company said from 795 Oak Ridge Tnpk., Oak Ridge, Tenn. 37830.

DG to Set Micronova 16-Bit in Motion

NEW YORK – Conference attendees visiting Booth 1503 can see Data General Corp.'s (DG) first public demonstrations of its high-level Ansi-74 Cobol compiler and the 16-bit microprocessor-based Micronova.

The Cobol compiler will run on an Eclipse C/300 minicomputer, DG noted. It fully supports Infos, DG's data base-oriented file management software.

The Micronova models 8562 and 8563 feature a 16-bit microcomputer with 2K- or 4K-word random-access memory (RAM); additional RAM and programmable read-only memory (Prom) boards expand system capacity to 32K-words, DG said.

A Nova 3 computer which communicates with the Eclipse C/300 in a distributed processing network will also be shown, the company said.

The input from the Nova 3 will be processed on the C/300 and the output transmitted back to the Nova 3 via a Multiprocessor Communication Adapter.

DG is located on Route 9, Southboro, Mass. 01772.

Micro Development Unit to Bow

NEW YORK – The Microkit-8/16, a stand-alone development system for writing, debugging and executing programs on Microkit, Inc.'s 8080 or 6800 microprocessors, will be introduced by the company at Booth 1034.

The system can be ordered with either the 8080 or 6800 CPU. Conversion packages consisting of hardware and software are available so each system can be converted to handle the other CPU, the firm noted.

Features of the Microkit-8/16 include 8K bytes of random-access memory (RAM) expandable to 32K bytes; memory write protect; a 960-character CRT display refreshed from system memory; a 53-key Ascii keyboard with two-key rollover; two audio cassette tape units; and a crystal-controlled programmable real-time clock.

The system also has an interrupt-driven I/O, vectored interrupt, bootstrap loader in programmable read-only memory (Prom) two RS-232C serial interfaces, 1M byte/sec DMA capability and six extra card slots for custom interfaces.

The Microkit-8/16 for either the 8080 or 6800 is priced at $3,850, with conversion packages available from $950. Microkit is at 2180 Colorado Ave., Santa Monica, Calif. 90404.

French Firm Coming With Micro System

NEW YORK – R2E, a French firm, will be participating with its American distributor, Warner & Swasey Co., in displaying the Micral M multiple microcomputer system in Booths 3119 and 3121.

The Micral M consists of up to eight Micral S microcomputers, with each Micral S independent from the other with its own I/O bus, interrupt system and memory. Each unit has its own local memory and shares the common memory so the local and common memory looks like one monolithic central memory for each processor, the firm said.

Programs are run either in the local memory or in the common memory. Memory protect provides a write instruction which references the common memory.

The system has a distributed multiprocessor operating system the firm said was based on sharing the common resources and common real-time task management.

The units can have from 6K to 510K bytes of memory and up to 64 interrupt levels and 512 sublevels, in addition to 64 1M byte/sec I/O channels, the firm added.

Warner & Swasey is at 30300 Solon Industrial Parkway, Solon, Ohio 44139.

Microdata Planning Birth Of Express Mini Family

NEW YORK – Microdata Corp. will be introducing a family of integrated minicomputer systems, a fixed-media "Winchester-type" disk drive and a 3M-type cartridge tape system at Booths 2345 and 3407.

The minicomputer family, Express, features a microprogrammed stack architecture with supporting software that provides multiterminal and multilanguage capabilities, the firm said.

The Express line will be available initally in two versions: one with a cartridge tape storage system and a larger version which will offer cartridge or IBM-compatible tape, Microdata said.

The first system will be priced at $20,000, the latter at $30,000.

The disk drive was designed to replace IBM 2314-type disk drives, low-end Storage Module and Trident-type disks.

The tape cartridge system, meant as an alternative to a reel-to-reel system, records data at 6,400 bit/in., extending cartridge capacity up to 10M bytes, it said.

Microdata is located at 17841 Red Hill Ave., Irvine, Calif. 92714.

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printers can put it all on paper at a reserved 30 characters-per second up to a snappy 300 lines-per-minute.

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See us at the NCC show—Booth no. 1219

COI Showing Mass Storage Units

NEW YORK – Computer Operations, Inc. (COI) will exhibit its direct-acccss minicomputer mass storage system at Booths 2007 and 2009.

Two of the Linc Tape II systems that will be shown were desgined for Digital Equipment Corp. PDP-11 and Data General Nova minicomputers.

The Linc Tape II is plug-compatible with over 10 minicomputers, COI said. Each system is supplied with the necessary cables, power supplies and interfaces.

Complete operating systems supporting assemblers, Fortran compilers, Basic interpreters, text editors, loaders and file utility routines are available for seven of the minicomputers.

COI is located at 9700B George Palmer Highway, Lanham, Md. 20801.

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At Data I/O Booths

ROM Emulation System Set for Display

NEW YORK – The Data I/O Corp.'s Read-Only Memory (ROM) Emulation System and the Model VIII portable programmable read-only memory (Prom) programmer will be exhibited by that company at Booths 2835 and 2837.

Data I/O will also show its Model VIII portable Prom programmer.

The Model VIII is an automatic MOS Prom programmer designed to meet the requirements for field service and microprocessor applications, the firm said.

Programming is accomplished using the keyboard, a master ROM or the Data I/O Ram-Pak memory cube as the input data source.

The ROM Emulation System is used to enter Prom program data into the plug-in Ram-Pak, the company said.

The Model VIII is priced at $1,700 and the ROM Emulation System costs $450 from the firm at P.O. Box 308, Issaquah, Wash. 98027.

Analyzer Appearing

NEW YORK – The introduction of a microprocessor analyzer for testing and debugging microprocessor hardware and software will be shown by the Motorola Data Products at Booths 1228, 1230 and 1232.

The MPA-1 reportedly captures 32-word segments of program execution and displays the data on a 9-in. CRT screen, the company said from 455 E. North Ave., Carol Stream, Ill. 60187.

Miniworld at NCC

Raymond Has Recorder

NEW YORK – Raymond Engineering, Inc. will show its Model 6409 Mini-Raycorder, a digital tape recorder designed for use with the firm's MI-50 data cassette, at booth 2102.

The recorder has a data capacity of 64K byte/side (unformatted), a packing density of 800 bit/in. and a data transfer rate of 2,400 bit/sec, Raymond said.

It was designed specifically for microprocessors, the firm said, and includes end-of-tape and load-point sensing and write inhibit.

The recorder is priced at $225 in quantities of 100 from Raymond at 217 Smith St., Middletown, Conn. 06457.

Varian Bringing Two Plotter Series

NEW YORK – Varian Graphics will show its line of Statos 41 and 42 series of printer/plotters in Booth 3507.

The 41 series features a "Bi-Scan" writing head with a resolution of 100 stylus/in. Each model has a hardware-generated 123-character set and can be operated with either roll or fan-feed paper, the firm said.

The eight models in the 41 line range from $7,700 to $16,500.

The 42 series features 200 stylus/in. resolution and a 125-character set. There are also eight models in this line; prices range from $9,500 to $21,000, the firm said from 611 Hansen Way, Palo Alto, Calif. 94303.

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TANDEM

Tandem Computers Incorporated, 20605 Valley Green Drive, Cupertino, Ca 95014

Variable-Speed Tape Transport Showcased at Triple I Booth

NEW YORK – The Triple I Division of the Economy Co. will show its variable-speed tape transport, the Phi-Deck, at Booth 1629.

Phi-Deck features include four-motor control, remote control capabilities, fast start/stop and a rewind speed of less than 30 sec. It can be AC or battery operated.

The transport was designed for microprocessors.

The Phi-Deck is priced at $94.50 with discounts for quantity orders. Triple I is at 1901 North Walnut, P.O. Box 25308, Oklahoma City, Oklahoma 73125.

Miniworld at NCC

TI to Demonstrate 990 Micros, Minis

NEW YORK – Booth 2115 will feature a demonstration of Texas Instruments (TI) 990 line microcomputer and minicomputers, which are software-compatible.

The line includes the TMS 9990 microprocessor – the 990/4 microcomputer on a board and the 990/10 minisystem.

In addition the firm will demonstrate members of the Silent 700 series of terminals including the Model 745 and the Model 742 programmable unit.

TI Silent 700 Terminal

Magnetic Tape System Spotted at Booth 1829

NEW YORK – The Model 30-002 dual magnetic microprocessor peripheral system from Micro Communications Corp. features two magnetic tape transports, one for writing and the other for reading.

Shown in Booth 1829, the unit is compatible with Intel microprocessors of Motorola units, the firm said from 80 Bacon St., Waltham, Mass. 02154.

Programmed Power To Feature Monitors

NEW YORK – Power supplies and monitors will be the focal point of Programmed Power's Booths 2819 and 2821.

The Model 3500 automatic power line monitor features its own uninterruptible power supply (UPS) and prints out reports on line conditions and disturbances. It monitors each phase individually or collectively, the firm said.

Programmed Power will also show its System 475, which may be ordered either as a frequency converter or as a UPS. The frequency converter can be retrofitted to UPS, according to the firm, which is a division of Franklin Electric at 141 Jefferson Drive, Menlo Park, Calif. 94025.

Accessories at NCC

Matrix Publishers Seeking Authors, Reviewers, Friends

NEW YORK – Matrix Publishers, Inc., a company devoted exclusively to the publication of engineering and computer science texts and reference books, will be holding forth at Booth 1131.

The firm is currently looking for "authors, reviewers and friends," it said. Those interested can apply at 207 Kenyon Road, Champaign, Ill. 61820.

Standard Memories to Show Line

NEW YORK – Standard Memories, Inc. will exhibit its memory systems for minicomputers at Booths 2032, 2034, 2036 and 2038.

The Buscomm H-11 is compatible with Digital Equipment Corp. PDP-11s; the Pincomm 1 is plug-compatible with the Interdata models 7/16, 7/32, 8/32, 50, 55, 70 and 74; the Pincomm N was designed for the Data General Nova 2; and the Pincomm A is compatible with the General Automation SPC-16 models 40, 45, 60, 65 and 85.

The systems range in price from $1,350 to $5,065, the firm said from 2221 South Anne St., Santa Ana, Calif. 92704.

Qantex to Display Tape Systems

NEW YORK – Qantex will display several of its cartridge tape systems, which it said can offer minicomputers up to 23M bytes of storage with a minimum use of panel space, at Booths 2831 and 2833.

Two of those shown will be the 2400 tape storage system, which can handle up to eight tape drives, and the 2200, which comes with one or two tape drives.

The heart of Qantex's systems is the 600 tape drive, it said. That has a 3M data cartridge with 2.5M bytes, Qantex added.

Qantex is at 200 Terminal Drive, Plainview, N.Y. 11803.

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Montvale, New Jersey 07645

Accessories at NCC

From Software to Journals

British Coming to Colonies With Variety of Offerings

NEW YORK – Four software houses, two peripheral suppliers, a publisher and an institution will comprise the British participation, taking up a block of booths from 3100 to 3813.

Management Systems and Programming will show three software systems: the Datamanager, a free-standing data dictionary; Testmanager, a harness for testing programs; and Projectmanager, an automated project monitoring system. The company is located at 71 Gloucester Place, London W1H 3PF, England.

Genesys Library

Genesys Ltd. will have an engineer's library of computer programs on hand, which reportedly can be used on a range of programs. The firm can be reached at Pennine House, 2 Lymington St., Loughborough, Lell 1XA.

Northern Software Consultants has a range of integrated multiclient computer software packages designed for accounting and financial control applications for attendees' scrutiny, Northern said from 26 Brown St., Manchester M2 1DN.

Sintrom Electronic's booth will be the place to see the Perifile 6000C, said to be a low cost memory system for digital data recording. The system provides data input and output with storage facilities able to interface to most minicomputers and has software drivers and diagnostics, Sintrom said from 2 Arkwright Road, Reading Berkshire RG2 OLS, England.

The GD-1, a visual display terminal incorporating a microprocessor chip will be shown by Lynwood Scientific Developments, based in England at Caker Stream Road, Mill Lane, Alton, Hants GU34 2QF.

Gershire Journal

Gershire Ltd. will introduce its monthly journal, "Systems International" and its "UK Systems Product Guide Directory" at the show. Gershire is located at 103 Kent Road, Dartford, Kent, England.

Two software packages will be promoted by the National Computing Centre, a non-profit British organization. The Centre is active on the British and International fronts in providing information, advice and training in promoting, in consultation with other computer-oriented organizations, standards in software, it said.

The National Computing Centre address is Oxford Road, Manchester M1 7ED, England.

Booth 1100 Slated As Scene of Display For UPS From Exide

NEW YORK – ESB, Inc.'s Exide Power Systems Division will display a module of its Superguardian uninterruptible power system (UPS) at Booth 1100.

The UPS was designed to protect critical computer systems from disturbances in utility power. It also provides blackout protection through use of battery banks that can take over the power support role without interruption, Exide said.

Price of the system varies according to customer specifications, the firm said from Box 5723, Rising Sun and Adams Avenues, Philadelphia, Pa. 19120.

Broomfield Sets Bow Of Fan-Fold Stacker

NEW YORK – A fan-fold paper stacker will be introduced by Broomfield Industries, Inc. at Booth 1126.

The unit, Accu-Stac, folds fan-fold paper coming out of a printer by utilizing a positive folding motion in synchronization with a set of paper tractors, the company said.

Broomfield Accu-Stac Paper Stacker

The stacking rate is 8,000 line/min at 6 line/in. or 10,000 line/min at 8 line/in., a spokesman said.

After two initial settings on the stacker, no other adjustments are needed, the company claimed.

Broomfield is at Miller Road, Holland Patent, N.Y. 13354.

Liebart Coming to Show With Air-Conditioning Units

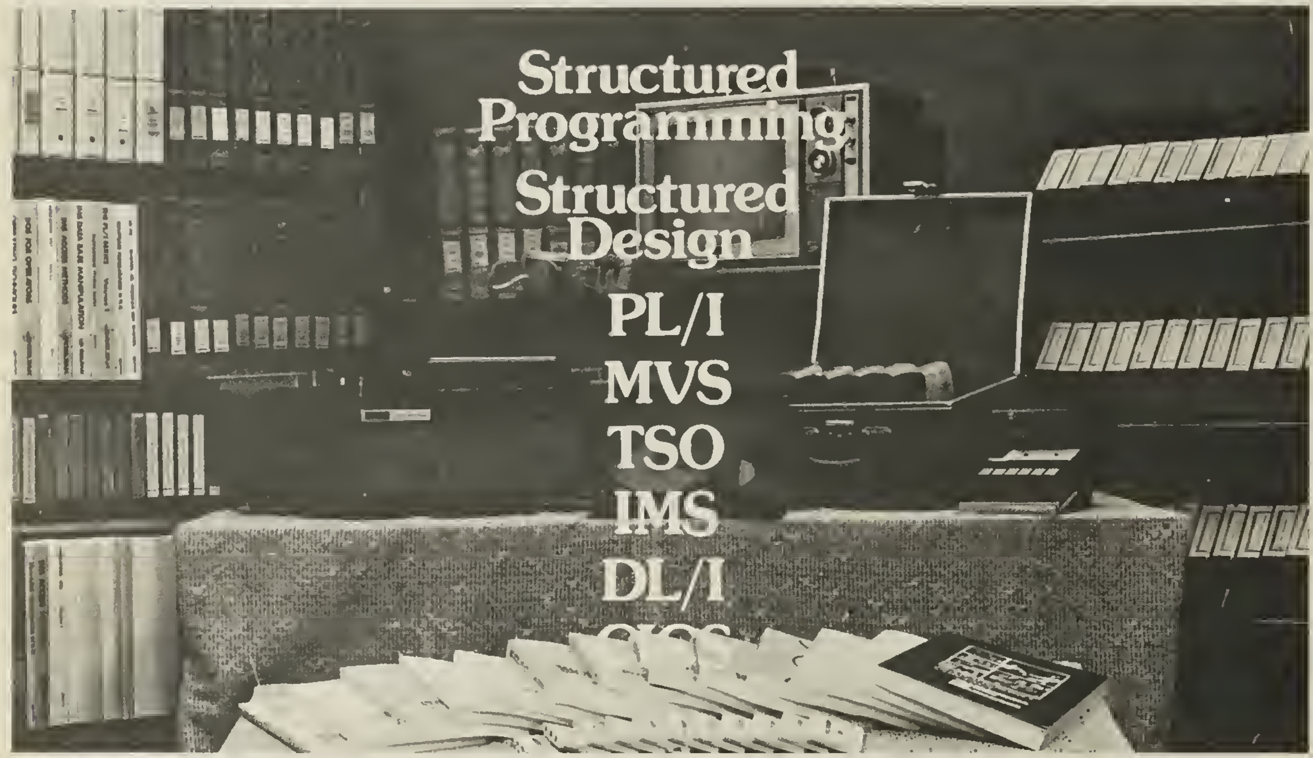
NEW YORK – Liebert Corp. will put its Deluxe System/2 computer room air-conditioning system, Liqui-Tector moisture sensing system and its Autoflush humidifier cleaning system on display at Booths 1345 and 1440.

The company is at 1050 Dearborn Drive, P.O. Box 29186, Columbus, Ohio 43229.

Hushcloth Display Planned

NEW YORK – American Acoustical Products will have its line of Hushcloth sound-suppression materials on display at Booth 1240.

The company is located at 9 Cochituate St., Natick, Mass. 01760.



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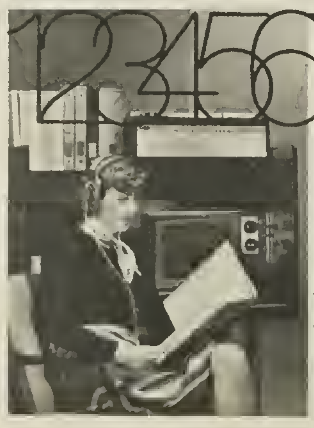

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Keytronic Sets C Series Debut

NEW YORK – The introduction of the C Series of solid-state keyboards from Keytronic Corp. will be spotlighted at Booths 1706 and 1708.

The series features 82-key keyboards and provides an extended Teletype 33ASR format with a numeric pad which is said to accomplish rapid numeric entry regardless of mode of operation.

Standard features of the Model C 1400 include solid-state keyswitches, two-key rollover, 18 coded function keys and tactile feedback keys, the company said.

Keytronic can be reached at Building 14, Spokane Industrial Park, Spokane, Wash. 99216.

Licon Exhibiting Switch Products

NEW YORK – Licon, a division of Illinois Tool Works, Inc., will have its line of switch products on display at Booths 1127 and 1129.

The company's latest products will be featured, including the Series 54 solid-state keyswitches, a LED keyswitch, a line of push-button switches and a door interlock switch.

Licon is located at 6615 W. Irving Park Road, Chicago, Ill. 60634.

Van San Hopes to Help Attendees Avoid Noise

NEW YORK – Conference attendees might be able to get away from some of the noise on the convention floor by visiting the Van San Corp. exhibit at Booth 1808.

The company will display its Quietizer Model 1111 acoustic cover for the Teletype Corp. 33ASR and Telex 32 ASR which costs $249.50.

Van San is located at 1180 Centre Drive, City of Industry, Calif. 91748.

Magnusonic to Focus On Magnetic Heads

NEW YORK – Magnetic heads will be the mainstay of Magnusonic Devices, Inc.'s (MDI) exhibit at Booth 1420.

Some highlights of MDI's exhibit will be its A2000 series of "flying heads," designed for use with IBM 2314 and equivalent disk drives and operating with disk packs, and the 6250 series of digital magnetic tape heads designed to read and record up to 6,250 bit/in. on 1/2-in. magnetic tape in Ansi-compatible format.

The firm is at 290 Duffy Ave., Hicksville, N.Y. 11801.

Knickerbocker Coming With DP Tool Cases

NEW YORK – Computer servicemen are vital to any DP operation, and they will not be forgotten at NCC. A line of computer servicemen's tool cases will be shown by Knickerbocker Case Corp. at Booth 3517.

Knickerbocker is located at 2950 W. Chicago Ave., Chicago, Ill. 60622.

Accessories at NCC

Reliance Showing UPS To Block Power Flaws

NEW YORK – The 125KW Lorain uninterruptible power system (UPS) will be shown at Booths 2240 and 2242 by Lorain Products Corp.'s Reliance Electric Power Systems Division.

Reliance is at 1122 F St., Lorain, Ohio 44052.

Premix to Show Fiberglass Units

NEW YORK – Computer components made of fiberglass-reinforced plastics will be shown by Premix, Inc. at Booths 1024 and 1026.

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The parts – structural members such as bases, housings, keyboards and covers – are molded out of sheet molding and bulk molding compounds.

Premix can be reached through P.O. Box 281, North Kingsville, Ohio 44068.

Datapro Bringing Information

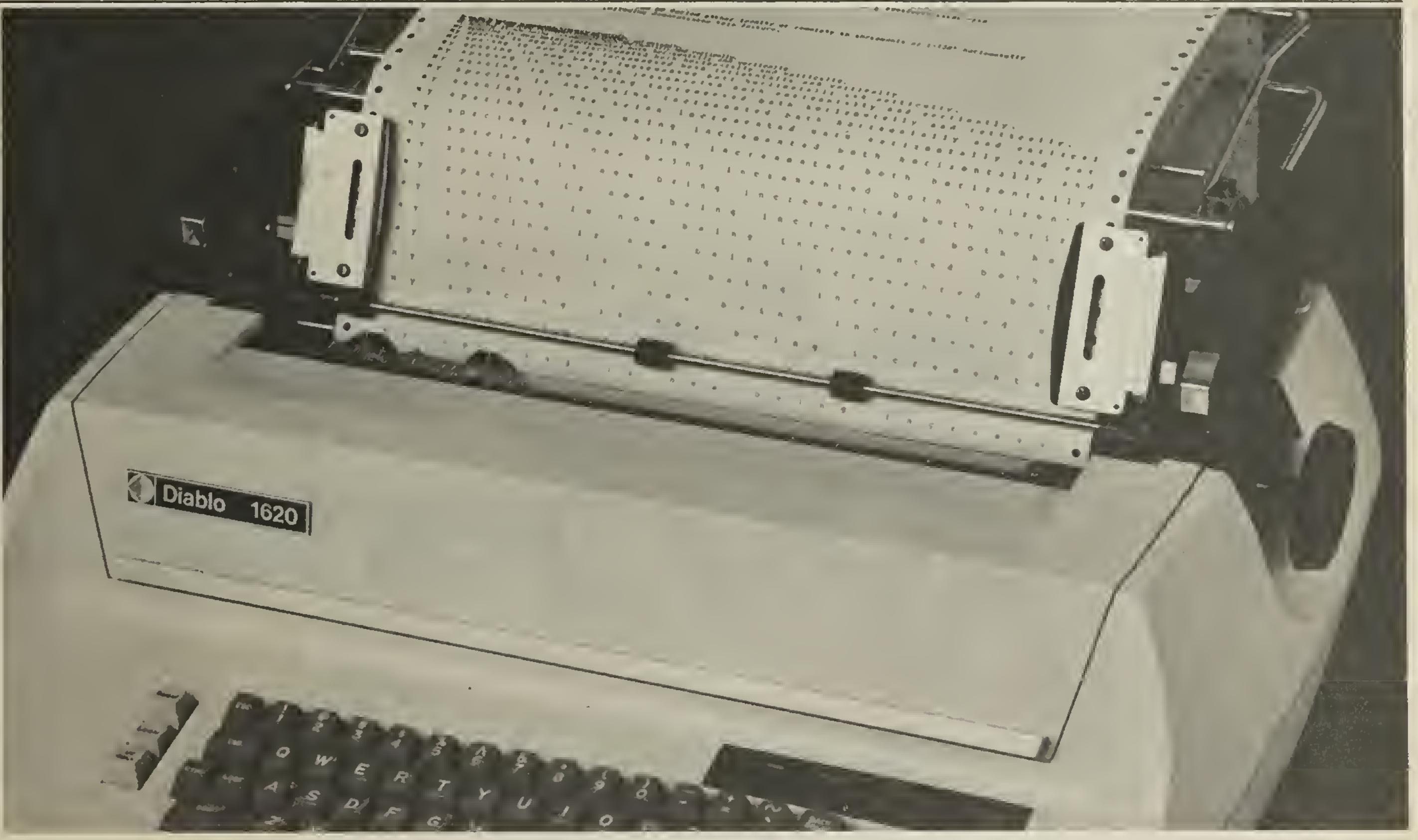
NEW YORK – Datapro Research Corp. will introduce an updated information service, *Datapro Reports on Retail Systems*, at Booths 2754, 2726 and 2728.

The information service will feature detailed product reports on integrated point-of-sale systems, electronic cash registers, electronic funds transfer systems, credit and payment systems, vendors, applications, specialized equipment, software and other retail areas, the firm said.

The service will consist of four components, Datapro said. These include a loosleaf volume of reports and data, bimonthly report supplements, *Retailnews* (a monthly newsletter) and a telephone inquiry service through which subscribers can get immediate problem-solving information.

The annual subscription price for the service is $290; NCC attendees, however, can order the service for $250.

The firm is at 1805 Underwood Blvd., Delran, N.J. 08075.



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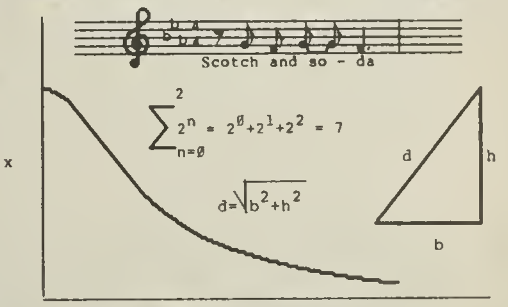

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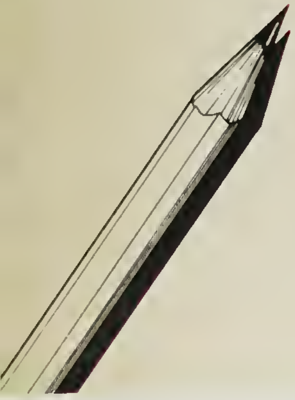

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CIRCULATION DEPARTMENT

High-Performance Micros Predicted

CPU Optimization, Storage Surprises Seen for Future

By Molly Upton
Of the CW Staff

BOSTON – The near future will see evolutionary steps for the optimization of large central processors and some real surprises in the storage area, according to panelists at the Electro 76 session on technology assessment here recently.

Several lamented the lack of improvement in man/machine interfaces.

While nearly all paid homage to the microprocessor, most agreed its significance would be its use in a wide range of applications rather than any future technological advances.

However, David House from Intel Corp. said the major impact of micros will be not from their low cost but from their potential high performance.

In the realm of storage, several speakers indicated there are new techniques emerging from laboratories that will change the manner in which computers deal with storage. One panelist said eventually there will be no hierarchy of storage.

Dr. Ugo Gagliardi of Gagliardi System Group told the audience the industry has the wrong perspective when it thinks of data processing as a processor industry. When one looks at the scene, he said, "this is a memory, data industry."

Future happenings in the memory area "could be much more significant" than those from expediting microprocessors," he said.

One surprise lurking in the wings will be a change in archival storage that will come from marrying the technique of home entertainment recording with archival storage, he said.

Video disk recording techniques can store 1 billion bits on a single disk that looks like, but is more rugged than a long-playing phonograph record.

The cost of these can be very low, he said.

With the anticipated market for this, Gagliardi has no doubt that someone will come up with read/write capabilities on this device.

"Think of the consequences on the industry of a billion bits on a $1 or $2 disk," especially regarding small systems, he said.

This could lead to widespread use of data bases for minis. "The opportunity is staggering," he said.

Gagliardi and others focused on the gap between file storage and executable storage. He defined file storage as disk and tape and executable as memory that was accessible.

"The gap is definitely going to be filled; maybe in two years," he said.

More Surprises

Here there is an opportunity for even more surprises, he said, warning the industry that if it focuses solely on plug-compatible replacement of drums and disks it is missing the boat.

"We are mesmerized by the concept of eliminating moving arms," he remarked.

But the real opportunity for the new type of storage, which would come from some of the emerging techniques, will arise from their natural inclination to mix computational ability with storage, such as pattern matching, Gagliardi said.

House suggested some techniques that may have this capability are charge-coupled devices (CCD), bubble and electron beam.

Walter Beam of the research and development office of the assistant secretary

(Continued on Page 62)

IBM, STC, Memorex Drives Rated Equal

By Nancy French
Of the CW Staff

DELRAN, N.J. – Users who left IBM for disk subsystems from Memorex Corp. and Storage Technology Corp. (STC) are just as happy with their systems' overall performance as those who stayed with IBM.

Those who chose products from six other independents were not, according to a Datapro Research Corp. survey published here recently.

Products from STC rated highest in every one of the five categories with the exception of ease of operation.

Users were asked to rate their disk subsystems in five categories: overall performance, ease of operation, hardware reliability, promptness of maintenance service and effectiveness of maintenance service.

To derive weighted averages, a numerical value of 4 was assigned to excellent; 3 to good; 2 to fair and 1 to poor. Each response was given equal weight regardless of the number of spindles represented, Datapro said.

Users of IBM, Memorex and STC rated their disk systems highest with a weighted average score of 3.5 for overall performance. California Computer Products, Inc. (Calcomp) and Telex Computer Products, Inc. were next with 3.3, and Ampex Corp. and Control Data Corp. were third with a 3.2. Itel Corp. was rated fourth with a score of 3.1, and Mohawk Data Sciences Corp. (MDS) trailed the pack with a 2.9.

CDC received the highest rating for ease of operation with a 3.8. Memorex and Telex were next with a 3.7, and Ampex, Calcomp and IBM shared third with a 3.6.

In the category of hardware reliability, STC was first with a 3.5 rating, IBM second with a 3.4, and Memorex third with a 3.3.

Ampex was fourth with a rating of 3.2, and Calcomp, CDC, Itel and Telex tied for last place with a 3.1.

Maintenance was evaluated from two standpoints: promptness of service and effectiveness of service.

In the area of promptness, STC users gave their systems a score of 4, making STC the only vendor to receive a perfect score in any category.

Calcomp and Telex were next with a 3.5, and Memorex was third with a 3.4. IBM and CDC came in fourth with ratings of 3.3.

As for maintenance effectiveness, STC and Telex won top honors with a score of 3.5. IBM was second with a 3.4.

Calcomp was third with a 3.1, and fourth place went to CDC and Itel which were both given scores of 2.9.

Subsystems Included

The disk subsystems included in the survey were IBM 2311 replacements; the IBM 2314 and its replacements from Ampex, Calcomp, CDC, Memorex and MDS; and the 2314-type double-density drives from Calcomp, CDC and MDS. (IBM never manufactured a double-density 2314-type drive.)

It also included the IBM 3330 and its replacements offered by Calcomp, CDC, Itel, Memorex, STC and Telex and the IBM 3330-II and its replacement from Calcomp, CDC, and Memorex.

It is interesting to note that in the category of overall performance, Ampex products received both the best and the worst scores.

The 312/314 replacement for IBM's 2314 rated the lowest of all with a 2.7, while its 322/324 double-density 2314-type drive received a perfect 4.

Datapro suggested before "rushing out to order replacements" for all his disk drives, the user should consider replacements from three points of view.

First, Datapro suggested the user evaluate the workload and determine conversion costs.

The second consideration should be cost, the third, reliability. Reliability, the report noted, can be judged only after talking with other users.

Intel Has IBM 370/168 Memory

SUNNYVALE, Calif. – A stand-alone add-on memory system for the IBM 370/168 has been announced by Intel Memory Systems here.

It features a microprocessor-powered maintenance panel, modular power supply system and a price tag 30% lower than that of the IBM model, according to the vendor.

The IN-7168 memory system stores from 1M bytes to 8M bytes in a single frame that is connected in parallel with the CPU memory port, Intel said.

When used with the minimum 1M byte of IBM memory a 168, the unit stores up to 7M bytes for a total of 8M bytes, the firm said. A second all-Intel 8M-byte unit can be added for a total capacity of 16M bytes.

Transparent to the CPU in operation, the microprocessor allows the user to identify failing memory parts, whether in the IBM or Intel part of the memory, Intel said.

If a repair is needed, the modular power supply in the unit allows the user to shut down the memory in 1M-byte units so that most of the memory can remain operational while the repair is being made, Intel said.

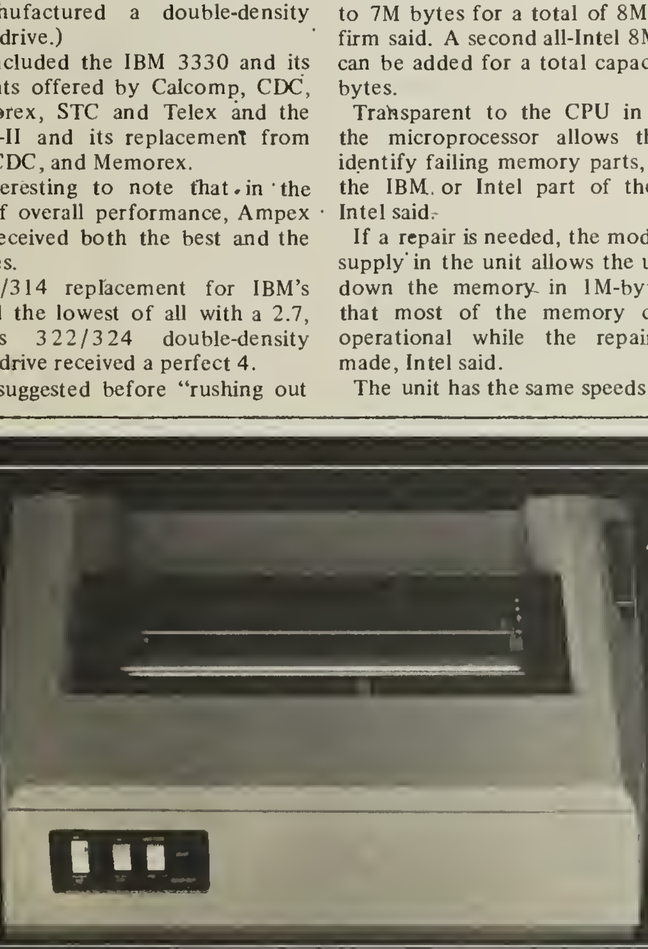
The unit has the same speeds as the IBM main memory for the 370/168 and the same four-way interleaved operations, Intel said. Cycle times are 320 nsec for full storage, 320 nsec for fetch, and 640 nsec for partial storage.

Service Processor

Intel's maintenance panel provides a memory service processor, comparable to that of the SVP in an IBM 370/168 Model 3. It contains an Intel 8080 microcomputer system and is designed not only to expedite maintenance of the Intel memory, but also to identify any failing memory in the 370/168 system. Thus, IBM's system configuration feature can be utilized to keep a maximum amount of storage continuously available to the CPU, Intel said.

Available to the operator are error logs for total memory and a power supply display. These allow the ability to reconfigure the total memory system to prevent errors from causing system crashes and also to avoid potential power supply problems.

The IN 7168 rents for $4,500/mo for a 1M-byte configuration or $32,000/mo for 7M bytes. A 1M-byte unit sells for $145,000, the firm said from 1302 N. Mathilda Ave., Sunnyvale, Calif. 94086.



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Helps Pick Repairman

System Predicts Firm's Service Demand

MINNEAPOLIS, Minn. – Minnesota Gas Co. (Minnegasco) has developed a computer system to predict the demand for service and help pick the right repairman for the job.

By mid-morning, Minnegasco knows approximately how many customers will call that day regardless of the weather. That information helps pinpoint for the customer when the serviceman will arrive.

The system samples customer demand in the morning and afternoon and predicts the total number of service calls expected that day based on the number already received. Approximately 40% of daily volume is received by 10 a.m. and 70% by 2:30 p.m. Minnegasco handles an average of 1,500 calls daily and as many as 4,000/day.

"Since installing the computer-aided dispatching system in 1973, we have increased productivity – service calls per man-day – more than 5%, and 'can't-get-in' reports are down 25%," Gene Nessly, vice-president, said.

"We know when a serviceman will arrive so that customers don't waste time waiting, and the repairman doesn't arrive when no one's home."

When a customer calls for service, a clerk enters the order and schedules a service call via a display unit linked to an IBM 370/135.

Dispatchers using similar devices display work orders and assign them to some 250 servicemen. Emergency calls appear more brightly on the display unit and get top priority.

Meters awaiting testing surround servicement at Minnegasco. The company uses a computer-aided system for dispatching its 250 servicemen.

Stored in the computer system are orders, skill levels of each serviceman, the equipment he carries in his truck, men per shift and length of time required to handle each type of service. The system combines this information with its forecasting ability to help dispatchers balance the workload.

As servicemen complete tasks and report in, dispatchers assign new jobs. They can use their display units to compare the time requirement of a specific job with a repairman's current workload to determine who should handle the next assignment.

"The system helps put the right man on a specific job," Nessly said. "We have enough men to handle emergencies as well as the routine maintenance and repair calls. This is critical since demand fluctuates. On the first cold day in the fall, for example, demand for checking furnaces skyrockets."

When an order is entered, the system checks to make sure it doesn't duplicate an earlier order. The system also prints reports to help Minnegasco check its ability to solve customer problems. One report lists "call backs" – customers who have requested service more than once for the same problem.

"We get reports which show how long a job should takc and compare that information with how long a serviceman spent on it. Not only does this help us in scheduling manpower, it helps identify people who would benefit by more training in servicing equipment. As appliances become more complex, our servicemen need more education."

Minnesota Gas Company is a natural gas distribution utility serving approximately 360,000 customers in Minneapolis, its suburbs and outlying areas. Its service force handled some 404,000 requests from customers last year.

Storage Surprises Seen for Future

(Continued from Page 61)

of the U.S. Air Force took a slightly different approach when he advocated use of data with its own characteristics. He said computer architecture will change to relieve the programmer of having to keep track of registers and other such chores.

This will be accomplished through attaching identifiers to the data, in a manner similar to that used by the APL language, he said.

In this way one can use low cost hardware to simplify the software, he remarked.

Solid-State Intermediary

Jim Thornton, president of Network Systems, said the storage hierarchy in four or five years will consist of central memory, buffer, working storage and archives.

But in 10 years, perhaps solid-state will remove these levels. There should be new storage/staging facilities that will introduce solid-state memory as an intermediary, he said.

In the world of nonmanual archiving, there will be a migration of data in the hierarchy of storagc levels until eventually "we'll see a smoothing over of the nature of the data and movement of it."

Eugene Shapiro of IBM categorized the progress in storage as evolutionary because of the economics of the massive installed base.

Within five to 10 years bubble memories will come into place somewhere in the hierarchy, he said, adding the thin-film-head technology is changing the argument about head per track.

But magnetic recording will be around for a while because of the economics and convenience. "If you want low cost, you'll give up time," he said.

Printers in Stone Age

Shapiro said the real need is to match printers to people. Until recently, "printers have been pretty much in the stone age," he said.

Eventually, printers will turn out documents that are useful and machine readable. This will spawn a new area of technology, he said, emphasizing there is a need for new ideas in this area.

Thornton said large CPUs will be around and described various efforts to optimize them reflecting the demands placed upon them by the terminal environment and increased data bases.

When the data base management function is removed from the host machine, then we'll see many innovations to improve the CPU, he said.

One critical problem, he said, is that systems are reducing the bandwidth at terminals at the expense of the bandwidth at the CPU.

Other speakers suggested that in the future the combination of data and logic could serve to solve this problem.

There will be a major tug of war between the standard channel and the intelligent controller attempting to remove the data base management task from the host machine, Thornton said.

Keith Uncapher, director of Information Sciences Institute, remarked the user's appetite for local processing power is growing. By 1980 there will be a demand for local power with three times the capability of thc Intel 8080, he said.

Uncapher called on software developers to recognize the need to support the user and makc these systems adaptable to users' local needs and idiosyncrasies.

The problem is there has not been nearly enough progrcss in interfaces for novices, he said.

DPers Chastised

BOSTON – Keith Uncapher, director of the Information Sciences Institute and former president of the American Federation of Information Processing Societies (Afips), chastised DP professionals recently for not doing more work on data protection.

He told an Electro 76 session he hopes industry can face up to and solve the problem in a responsible way.

Otherwise the alternative is to insure and posture ourselves like the medical community, and "we'll face malpractice suits soon," he said.

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Switches to On-Line Order Entry System

Bedding Firm Decides Not to Take Errors Lying Down

LOUISVILLE, Ky. – Moving to an on-line order entry system using an in-house computer from a combination keypunch operation that involved a service bureau has paid off handsomely, a home furnishings manufacturer here said.

For Louisville Bedding Co., a large manufacturer of mattress pads, the order entry operation is the first step in a planned, totally integrated system that ultimately should cover the entire cycle from forecasting to shipment.

Started in January, the real-time order entry program has resulted in faster order processing, fewer errors, better customer service and greater internal control of operations, according to Earl M. Tanksley, managent information systems manager.

Under the old system, Louisville Bedding experienced a considerable number of order entry errors plus as much as a 24-hour delay in discovering where an error occurred and then correcting it.

The number of orders "kicked out," according to Tanksley, now ranges from 3% to 4% vs. an average of 20%.

Apart from the benefits in better customer service, Tanksley said he expects the company will be able to achieve savings of more than $500,000 over a five-year period by using its own computer.

The system is being implemented on a Univac 90/30 computer using the Univac Information Management System 90 (IMS/90).

Prior to the on-line system, orders were manually transcribed from the customer's documents to company forms, then sent for keypunching at a service bureau.

Under the in-house system, the orders are entered directly into the 90/30 by order entry personnel using Uniscope 200 visual display terminals.

Created Master Forms

"Because many of our large customers buy similar goods with each order," Tanksley said, "we've created contract master formats for them which we can call up from disk storage whenever we're ready to enter new orders.

"With the contract master displayed on the CRT, the operator only has to key in the variable information – quantities ordered and requested shipping date – and assign a 6-digit control number for each order."

Prior to accepting the order, the system checks customer credit limits, availability and prices. If there are any problems in filling the order or if incorrect information has been entered, the computer will flag the operator by a blinking light that draws his attention to the problem area of the format.

The information is edited on-line and then transmitted to the computer, Tanksley said.

Still Uses Service Bureau

Now, during the development phase, the orders transmitted from the terminals go into the disk storage files on the 90/30. At the end of each day a magnetic tape is prepared containing all the orders received that day.

This tape is sent to the service bureau, which the following morning updates inventory records and all relevant company files and generates picking lists for the distribution center.

Updated copies of the files on magnetic tape are returned for entry into the in-house system.

However, as new systems are developed and implemeneted on the 90/30, these applications will be discontinued at the service bureau, Tanksley said.

The decision to acquire an in-house computing capability resulted from an evaluation of Louisville Bedding's operations conducted by Peat, Marwick, Mitchell & Co., management consultants.

"The evaluation was necessary because we realized that our continued high rate of growth was surpassing our ability to capture the vital information we needed to control our business on a timely basis," according to Harold C. Forrester Sr., president and treasurer of Louisville Bedding.

"While our previous DP system was sufficient to carry us through when we were handling a much smaller volume, it was totally inadequate to cope with our present rate of growth.

"Additionally, we felt we could respond to the marketplace much sooner and effectively with our own computer."

As part of Peat, Marwick, Mitchell's recommendation for the firm to engage an experienced systems manager, Tanksley joined the company to survey the company's requirements and recommend proposals to top management.

At the same time, a management committee was formed to review and coordinate the plans to revamp operating procedures.

One of the committee's decisions was to implement entirely new systems rather than try to build on the existing system. Another was to acquire an in-house computer with the capability of meeting the company's growth needs over the long term.

Louisville Bedding's 90/30 system has a main storage capacity of 132,000 bytes as well as extended mass storage on two Univac 8416 disk drives totaling 57.8M bytes.

Other components of the system are two Uniservo 6 magnetic tape subsystems (shortly to be replaced by Uniservo 10s), a visual display unit on the operator's console, card reader and printer.

Currently the system also includes one Univac 1710 keypunch and six Uniscope 200 displays – four in order entry, one for programming and another for file maintenance and inquiry.

Additional Uniscope 200 units are planned for installation in the customer service, production planning, shipping and accounting departments, Tanksley said.

Tanksley believes one of the main benefits of the system will be much finer inventory control than before. A terminal in the distribution center will immediately report to the computer all arrivals of finished goods.

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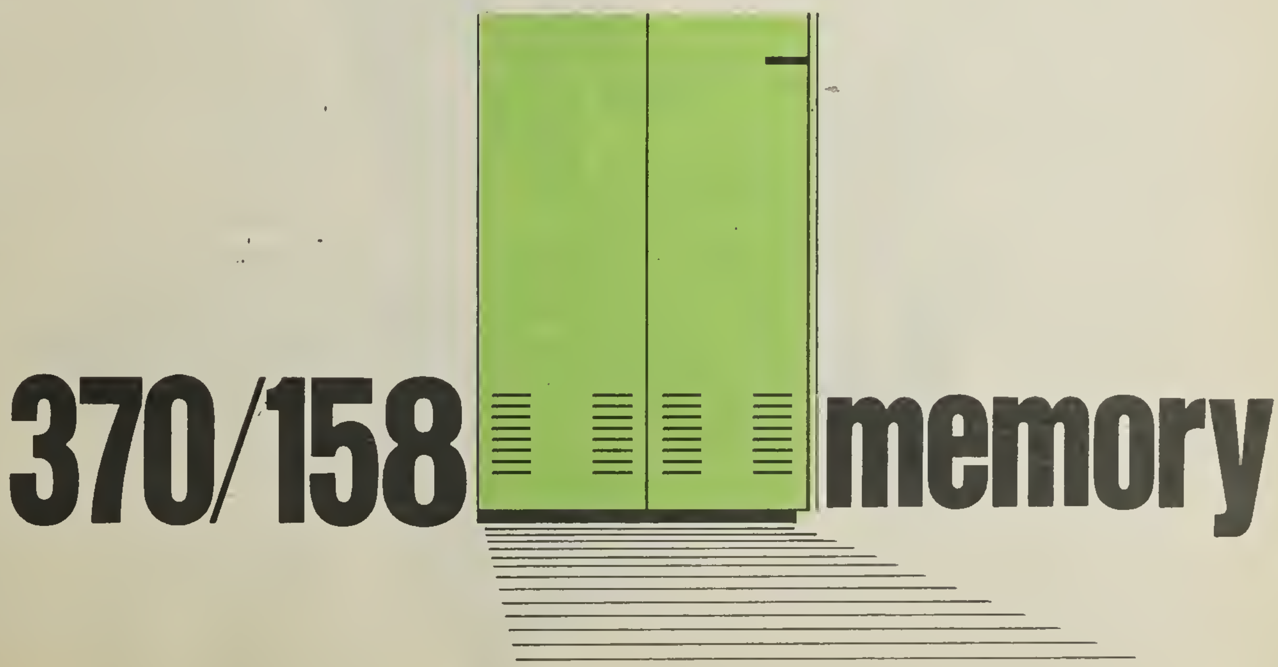

High-Capacity Disks Speed Throughput, Reduce Costs

By Gary M. Holtwick

Special to Computerworld

Studies have shown that as much as 90% of the volumes in a tape library contain less than 10M bytes of data and that 50% of the tape volumes contain less than 1M byte of data. Using 6,250 bit/in. tape, these data sets (less than 10M bytes) will occupy less than 300 feet of tape on a single volume.

The economics of these data sets remaining on tape are poor. The characteristics of these tape data sets strengthen the merits of tape replacement with high-capacity disk.

Tape replacement suggests moving small tape data sets to on-line high-capacity disk to achieve the following benefits:

- Reduced tape library size.
- Faster throughput.
- Fewer tape mounts.
- Improved reliability.
- More availability.
- Increased computing capacity.
- Lower personnel costs.
- Reduced media costs.

There is a great deal of interest today in mass storage systems. In the accompanying article, an alternative to mass storage systems is presented which calls for the use of Storage Technology Corp.'s Model 8800 "superdisk" and 6250 tape units.

When choosing tape data set candidates for conversion to large-capacity disk, data set activity, capacity and cost of storage should be considered. Only those data sets that will be cost-effective on disk should be converted, therfore keeping on-line storage requirements at a minimum.

The following formula can be used to determine which tape data sets should be converted to disk when considering cost effectiveness:

Data Set Mounts Per Month = DASD Cost (Cost/Megabyte/Mo)

Data Set Size in Megabytes = Tape Cost (Cost/Mount)

For example, consider a 1 by 4 Storage Technology Corp. (STC) 8800 configuration for tape replacement at a cost of $1.95/megabyte/mo and a typical tape mount cost of $1.95. The cost-effective ratio (the right side of the previous formula) using the above cost equals one.

The formula now states that any data set whose mounts per month divided by its size is greater than (or equal to) one will be cost-effective on large-capacity disk.

Once data sets have been selected for migration to disk, storage requirements can be further reduced after reviewing the following operational considerations.

When operating from disk rather than tape, it is beneficial to use Generation Data Groups (GDG) to simulate the classical old master/new master operation tape. A generation data set is one of a collection of successive, historically cataloged data sets known as a Generation Data Group.

The system keeps track of each data set in a generation group through use of the system catalog so that new data sets can be chronologically ordered and old ones easily retrieved.

To create or retrieve a generation data set, the generation data group name is used together with a relative generation number (. . . -2, -1, 0, +1, +2 . . .). This allows access to data sets chronologically using a relative number.

The current data set is relative zero. Using this scheme, +0 represents the current data set (the new master), -1 represents the old master, -2 represents the previous old master, etc. Because data sets older than -1 are normally in existence only for historical or backup purposes and are seldom accessed, STC recommends that only two generations (0 to -1) be kept on-line.

On-line storage requirements of GDG can be considerably reduced by archiving multiple-generation data sets on a single reel of tape. STC's Generation Data Group Migration Program (STCGDG) can be used to migrate -2 or older generations to magnetic tape.

STCGDG will scan designated disk volumes and migrate to tape -2 or older generations which are not specifically protected by utility control statements. Successful migration will subsequently trigger recataloging and scratching the migrated data set from disk. Upon the completion of a disk volume scan, STCGDG will optionally scratch any temporary data sets older than the current date and then provide a formatted listing of the VTOC.

This procedure not only minimizes disk management activities (scratch operations), but also significantly reduces backup requirements and recovery times when used with the following allocations method.

Assignments of data sets onto a specific volume (or group of volumes) may be accomplished by specific device address, generic names, esoteric names or "VOL=REF" parameter in the DD statement.

Controlled by Personnel

By creating catalog entries to be used by the VOL=REF parameter, data set allocation can be controlled by the systems personnel wtih transparency to the user. The spreading of data sets over multiple volumes by nonspecific volume requests can then be avoided by assigning the Private attribute to these disk volumes.

Installation procedures should be set up requiring the use of the VOL=REF=STC.GDG parameter when allocating generation data sets with the cataloged dummy data set STC.GDG pointing to a disk volume (or volumes) on the same physical spindle to be used for GDGs.

The operations personnel can then flip/flop the STC.GDG pointer by recataloging the data set pointer to a different physical disk module on a periodic basis. In the event of a module being unavailable, this would then force even/odd generations to different physical modules and minimize recovery time.

If a disk module becomes unavailable and it becomes unnecessary to run production jobs using data sets contained on that module before the module is again made available, a rerun is necessary using the previous generation.

In all cases the previous generation will be available on another physical module. Thus, a rerun is followed by the production run. Once the down module is made available, no adjustments will be necessary.

Holtwick is a software support engineer at STC.

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Mini Bits

Mini Devices Among Units Reduced in IBM Repricing

ATLANTA – Some of the price reductions on selected IBM equipment announced recently [CW, May 24] affect products from the company's General Systems Division (GSD).

Some examples of IBM repricing include the following:

- The binary synchronous communications adapter for the 3/6 and 3/10 has been reduced from $10,630 to $9,570.
- The Autocall feature on the 3/6 and 3/10, formerly $1,795, now costs $1,620.
- The Expansion Adapter for the IBM 1130 is now priced at $128 instead of $149.
- On the IBM 1800 system, the Analog-Digital input converter costs $3,850; it formerly cot $4,270.

For the System 7, IBM has reduced the line interface from $1,020 to $860, the GSD said from Atlanta, Ga. 30301.

Application Competition Set

WESTBURY, N.Y. – The First Annual Microprocessor Applications Competition was designed to inspire people to "narrow the gap between today's challenges and tomorrow's realities."

A complete entry kit for persons who wish to participate is available from Schweber Electronics Corp., the competition's sponsor.

Some of the competition requirements include a systems concept; block diagram; listing of component parts; program source listing; and a 50-word description of the project itself.

The project should "make the world a better place in which to live," a Schweber spokesman said.

Judges will look for such qualities as the uniqueness of application, practicality of usage and efficiency in program structure, he noted.

Prizes include a $1,000 grand prize and judging will be done by "prominent leaders from the scientific, educational and electronics business communities," he added from Schweber Electronics Corp., Westbury, N.Y. 11590.

HP Cuts Prices on 9640, 9700

PALO ALTO, Calif. – Hewlett-Packard Co. (HP) has reduced the prices of its HP 9640 and HP 9700 mini systems by $1,000 and $2,500 respectively.

The reductions were possible because of less costly 18-pin 4K random-access memories, a spokesman said.

The HP 9640's price is now $15,800 while the HP 9700 costs $34,800, the firm said from 1501 Page Mill Road, Palo, Alto, Calif. 94304.

'Pretty Much Operatorless'

Minis Seen Obsoleting DP Departments

By Esther Surden
Of the CW Staff

SAN FRANCISCO – "Minis are no more revolutionary than typewriters were when they were introduced and, since there was no need for a typewriter department, there will be no need for a DP department," Paul D. Ray of R.R. Associates said here recently.

"Minicomputers are pretty much operatorless machines, and that scares some people," Ray continued. With the advent of minicomputers, the need for keypunch personnel and system operators has almost disappeared, he told a Computer Caravan workshop.

"If I were to define a minicomputer, it would be a system that costs between $20,000 and $300,000 for a complete configuration," he said, adding the word "mini" doesn't mean "small in performance.

"The slowest minicomputer ever built is probably faster than the IBM 360/30," Ray said.

The architect who first designed minicomputers took advantage of all the mistakes by the large mainframe manufacturers so the architecture of minicomputers permits "things that are very expensive on other machines," he told the group.

The small systems have the edge when it comes to on-line processing, he added.

"Despite what I say today, I don't want you to get the impression minis are out to replace the big mainframe," he said, because most minis are "not manufactured with the sole reason to run batch."

Certain types of batch processing will always be needed, he explained.

Not for Batch

A bad point is that most minis are 16-bit word machines, and that imposes a limit on the amount of memory that can be plugged in or the number of peripheral devices that can be attached, Ray said, but noted mini makers are finding ways to get around this limitation.

Prices on minicomputer systems will come down in the next year, but not as much as they have in previous years, Ray predicted.

"During the past year, things have stabilized" because the manufacturers have redirected their energy from the CPUs to all the "things that go around it, such as software and I/O."

'An Old Burroughs Trick'

"The next evoluation will take advantage of microcomputers" by "doing an old Burroughs trick" and taking the control capabilities out of the software and putting them in the hardware, Ray said. This will mean the ultimate decentralization of computer functions.

Minis have been held back in software development to a degree, according to Ray. At first the systems were used for process control applications; when they moved away from this, the first two languages that were developed were Fortran and time-shared Basic because the hardware suited these best.

Hardware Changes

Now the manufacturers are realizing the hardware must be changed to efficiently accommodate other languages, he said, noting Data General Corp. introduced the Eclipse to put Cobol and RPG on its hardware.

Some minicomputer makers build languages that only operate on their own machines, but some users are suspicious of this, Ray said.

"Despite what you may hear about an Assembler language, from machine to machine the basic structures are there and you can be as simple as you want or as fancy as you want," Ray told the attendees.

Datum Bases Nucleus Systems On CPU Emulating GA SPC-16

ANAHEIM, Calif. – Datum, Inc. has introduced four configurations called Nucleus Packages which are based on the firm's Enhancer 1, a CPU that emulates the General Automation (GA) SPC-16 minicomputer, according to a spokesman.

Designed to use GA's RTOS, DBOS and data management software, the systems combine the Enhancer with a variety of peripheral controllers in a single enclosure, Datum said.

The user can obtain peripherals from Datum or other OEMs to complete the system, the firm said.

The Enhancer processor is microprogrammable, allowing additional instructions such as decimal arithmetic and string manipulation to be added, the firm said.

Commonly used or complex subroutines can be implemented in the control store; 256 locations are necessary for the emulation of the SPC-16 instruction set, Datum said.

Control store is expandable to 4K words, the spokesman noted, adding special-purpose instructions can be added in firmware.

The systems are capable of expansion to 64K words of core within the basic enclosure, Datum said. Additional peripheral controller options may be added for expanded capability, it noted.

The EI/16-RT Nucleus Package was designed for real-time, disk-based applications. The configuration includes the CPU with 32K 16-bit words of memory; a controller for up to four IBM 2315- or 5440-type cartridge disks; and serial I/O for Teletype or CRTs. It costs $13,950, the firm said.

The EI/16-DB Nucleus is an expanded version of the RT with a line printer controller, card reader and punch. The printer controller can accommodate printers with speeds of 300- to 1,200 line/min. It costs $16,350, Datum said.

The EI/16-D3 includes the Enhancer with 32K words of memory; controllers for fixed or removable disks; line printer; card reader; card punch; and up to four CRTs. Line speeds are program-selectable from 100- to 9,600 bit/sec. The configuration costs $18,350.

The EI/16-D4 is an augmented version of the D3 with 48K of core, controllers for additional disk, line printer, card reader, card punch and four CRT lines. The price is $24,750.

The systems are available within 30 days with no peripherals; with peripherals, the packages take from 60 to 90 days for. delivery depending on the availability of the devices, the spokesman said from 1363 S. State College Blvd., Anaheim, Calif. 92806.

CW Wants to Know About Your Site

A *Computerworld* Special Report on minicomputers and small systems scheduled for the Aug. 30 issue will focus on minis in distributed processing networks.

If you have implemented a mini network or have tips for other readers on how to go about doing so – and about what to avoid – write us a letter and tell us about your installation. Or submit a three- or four-page manuscript typed double-spaced by the end of June.

We'll be in touch as soon as we receive your contribution. Send your letters to Esther Surden, Computerworld, 797 Washington St., Newton, Mass. 02160.

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31	Manager/Supervisor Programming
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Stores Ancient Greek Texts

Mini Aiding Development of Thesaurus

IRVINE, Calif. – Scholars at the University of California campus here are teaching a minicomputer to write in ancient Greek, bridging 2,800 years of knowledge.

The $1 million project, called Thesaurus Linguae Gráecae (TLG), which is said to be one of the largest research efforts ever made in classical studies, is collecting and storing in a data base every word of ancient Greek preserved from antiquity.

The purpose of creating the file of 90 million words – the total body of Greek writing – is to provide classical scholars with a tool for studying how words were used and how their meanings and semantic shadings have changed over the years.

"The finished thesaurus will provide humanities scholars in fields such as history, philosophy, philology and literature with an invaluable reference work designed to aid them in interpreting and understanding the written records of the past," according to project director Dr. Theodore F. Brunner.

The computer facility used here in the TLG project offices includes a Varian 620L minicomputer linked to a Varian Statos 3111 electrostatic printer/plotter. The mini's main function is to work in conjunction with the printer/plotter to produce hard copies of the texts, in Greek, Russian or large-font English.

A teleprinter is also connected to the 16K Varian mini which connects over campus telephone lines, in distributed system fashion, to a Xerox Corp. Sigma 7 central campus computer.

The CPU, which is used to read and store the Greek texts in coded form, also connects to three teleprinters and a display terminal in the TLG project offices.

Building Data Base

All of the ancient Greek literature between the time of Homer, about 850 B.C., up to 600 A.D. will be coded and recorded on magnetic tape.

When a specific word needs to be studied, the system, using TLG-developed programs, will produce listings of each instance of the word's appearance with its appropriate context and word grouping.

The listings will then be sent to cooperating scholars around the world who will provide semantic information about the word as used by a given author, taking into account the historical period and the literary context.

The TLG staff will collect and edit all the received materials; enter them into the data base; and publish, volume by volume, on a first-completed, first-issued basis, the Greek thesaurus.

So far, 80 tape reels containing 18 million words of raw data have been recorded. The first volumes of the thesaurus are expected to be issued before 1980.

The computer processing of the first 20-million words (from Homer through 200 A.D.) represents the project's initial phase. Then, approximately 70 million additional words will be processed, taking the project through the sixth century A.D., which marks the transition from ancient to medieval Greek society.

The documents for entry into the computer data base are selected by the TLG Advisory Board.

Technician's Nightmare

"Processing texts taken from torn and decomposed papyrus fragments is a nightmare to computer technicians," Brunner said, "but it gives us valuable insight into how the language was used in everyday speech."

The catalogued documents are marked to indicate which portions should be entered into the data bank and which shouldn't. Line numbers indicated in the edition are changed to conform to a standard system established by TLG.

Indentation of lines and other instructions are added by TLG staff members so that the page can be recreated as it appeared in the original source. Each source is then double-checked.

Then the Greek texts are keypunched line by line onto cards.

Complicating matters, because the keypunch system is not geared to Greek, the keypunch operators perform a mental translation of the printed Greek text into a special code using English letters and Arabic numerals.

To be sure that no errors are entered into the text at this translation and keypunch stage, separate keypunch operators work independently to create two sets of computer cards for the batch. Each set is then used to create a separate magnetic tape.

The two tapes are compared by a computer programmed to find discrepancies which are then reconciled by comparing the source material with the tapes.

The checked tape is next shipped here and placed on the Sigma 7's CPU magnetic tape drive in the university's DP center. The central system reads the tape and performs a series of verification programs to check the material against orthography rules.

When a violation in the text is found, the verification stops, the text is displayed on the CRT in the TLG offices and the operator provides a solution to the problem before the system continues.

Using this technique of finding errors is actually leading to more accurate texts than was started with, the user said.

The texts contain many type sizes, type faces, Latin letters, italic superscripts and annotations of medieval scholars in foreign languages. To be able to recreate pages with the system means that each variation must be coded to indicate to the system which alphabet set is to be used, Brunner said.

Three Micro-Based Controllers Offer Nova, PDP–11 Users Options

BURLINGTON, Mass. – Xylogic OEM Components Group, Inc. has three microprocessor-controlled cartridge disk drive controllers that offer alternatives to their Digital Equipment Corp. PDP-11 and Data General Corp. (DG) Nova counterparts, the firm said.

The Sector Address Verification feature assures the user that program and master files will not be accidentally overwritten, the firm said. The user can also mix work files and permanent files on the same disk drive by taking advantage of sector-level or write protect, the firm said.

Additional standard features include automatic cyclic redundancy check data verification, multiple sector transfers, parallel seeks and automatic detection and by-pass of defective sectors, the firm said.

A built-in self-test feature verifies all data path and control logic circuitry at full operating speeds with disk units switched off-line, the firm said.

The Phoenix 45 is packaged in a standard system unit for installation in a PDP-11 or expansion box and is media- and software-interchangeable with the DEC RK-11 controller. The Phoenix 35 is interchangeable with the DG 4046, and the Phoenix 40 with the DG 4234, a spokesman said.

The 35 and 40 cost $3,150 while the 45 costs $3,575 from the firm at 42 Third Ave., Burlington, Mass. 01803.

Turnkey System Has DEC Hardware

NEW YORK – Datatab Corp.'s Solution 77 Model 354 is a turnkey minicomputer based on Digital Equipment Corp. hardware, the vendor said.

The system, designed for business applications, performs order entry, inventory control, billing accounts receivable, accounts payable, general ledger and payroll functions, the firm said.

Hardware includes a DEC PDP-11 minicomputer with up to 36K of memory, removable cartridge disk memory with 2.4M characters per disk and up to eight drives available, a choice of one to four terminals, either CRT or hard copy and a 132-col. printer, Datatab said.

The system "converses with the user in English, giving procedural guidance and an explanation of any input errors detected as the information is entered into the system," Datatab said.

A typical Model 354 including all application software would cost $60,000, a spokesman said from the firm at 888 Seventh Ave., New York, N.Y. 10019.

Correction

The user in the story "Switch from IBM 3 Ends Batch Era for Car Dealer" [CW, May 17], had an IBM 3/10. Also the stock orders have 900 to 1,000 line items each, not 9,001 as reported.

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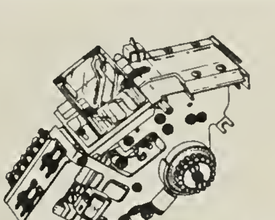

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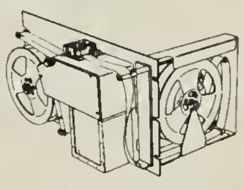

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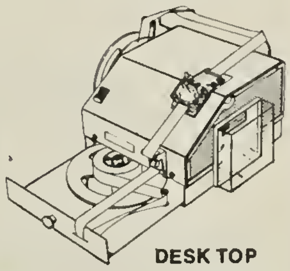

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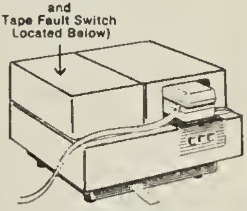

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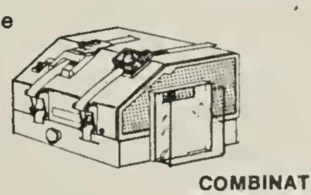

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Pitfalls Often Outweigh Advantages

Caution Advised When Considering Unproven Equipment

By Jon David

Special to Computerworld

Minicomputer Exchange

Ask any sales representative. He'll tell you. New minicomputer equipment, frequently offered at less cost than not-as-capable but proven alternatives, has been "thoroughly tested and without failure for a zillion hours so far."

Or don't ask him. He'll tell you anyway. Just buy his nice new equipment – what could possibly go wrong?

Every time a product is introduced, there are significant potential problem areas. If the equipment is a CPU, it must be interfaced with all available peripheral equipment; support all software operating systems, languages, utilities and other libraries; and this software must support all peripheral equipment.

If the product is a piece of peripheral equipment, it must interface with the CPU and software.

A Simple Choice?

An end user often finds himself with a choice between two pieces of equipment, one offering more power and capacity than the second. They are often at the same price, but if this is not the case, the "better" piece of equipment is normally only a few dollars more and therefore has significantly greater cost/effectiveness.

Even though a user might not need anything beyond the "lesser" product, who knows what changes time may bring to his requirements? Who can fault him for selecting the newer and "better" product?

And although very few applications ever tax the limits of the capabilities of existing minicomputers, manufacturers continue to announce new and more powerful computers and peripheral devices.

Minicomputers have long been able to perform a million or more operations per second; access billions of bits of disk storage; drive line printers at speeds up to thousands of lines per minute; and service dozens, if not hundreds, of concurrent users.

New minicomputers have extended instruction sets, even greater memory capacities, faster memory speeds, different input/output structures and different internal logic.

A new peripheral offers greater capacities; faster operation; different internal logic; and new functional capacities such as memory buffers, intelligence and the like to lessen the computer load.

So a user buys a system containing new and improved equipment.

The system gets delivered. Every component is tested. The software, working in hundreds of other installations, is loaded. The "go" button is pushed, but the system doesn't go. Each component seems to work exactly as it should, but somehow when delivered, the entire package does not work.

Is it the mini? The computer diagnostic runs for hours on end and certifies that the computer is perfect. The peripheral? That, too, tests as working properly. The only thing left is the interface, but exhaustive tests indicate there is no problem in this last area.

Three sets of equipment, each working "properly," yet the combination of the three does not work. Why?

Computer equipment is tested by diagnostic programs. These programs initiate certain equipment functions and test results.

To test results they must, however, make certain assumptions regarding what those results should be. The results for a particular piece of equipment being tested in and of itself are often not the results obtained from that piece of equipment operating in conjunction with other pieces of equipment or operating in a "live" environment. The diagnostic programs therefore frequently do not test the situations that exist when pieces of equipment are delivered and put to use. But, this is not the only problem.

When dealing with new products, field personnel are frequently untrained in diagnosing and treating failures. Even if trained, they certainly cannot be experienced.

The Mini Exchange is intended to be a means for users to present ideas about minicomputer problems and performance. Readers are invited to respond to this commentary or submit manuscripts about significant topics.

Computer equipment has thousands of functional areas, and millions of possible problem paths; it takes quite some time for a service representative to know which areas should be tested and which should be ignored.

Until a piece of equipment has been around for a reasonable amount of time and in a fair number of configurations, new and complex problems can occur on a regular and continuing basis.

Every time a person drives a car he has a chance of becoming a traffic fatality, yet he drives for both business and pleasure. With the possible hardware, software and maintenance problems associated with the installation of new equipment, should a user get it?

Yes and no, but not necessarily in that order: Yes, he should get it if it is the only equipment that can provide the capabilities he must have at a price he can afford. No, he should not get it if he has any other alternative.

Although there is no guarantee that there will be problems with new products, a user is probably more likely to win a lottery than to escape trouble-free, and the troubles can often involve many months of downtime.

The minicomputer field is literally changing on a day-to-day basis. If there was no need or marketplace for new equipment, this would not be the case. As new equipment is delivered to highly sophisticated and technically oriented companies or to end users who can tolerate extensive downtime, initial design problems tend to surface and be rectified, and both hardware and software personnel become more familiar with the equipment.

David is president of Minicomputer Industry National Interchange (Mini), a professional society treating minicomputers, microcomputers and associated technological techniques, and also is president of Systems, RDI.

IBM Adds Storage for 3/8, 3/10

ATLANTA – IBM has an additional disk storage unit for its 3/8 and 3/10, the firm said.

The IBM 5448 disk storage drive adds nearly 10M bytes of fixed-file disk storage to the models.

Added to an existing system with an IBM 5444 disk storage drive, the 9.8M-byte disk drive will provide total capabilities of 14.7M-, 17.15M- or 19.6M bytes, IBM said.

The 5448 has four fixed disks with eight recording surfaces and will be connected as a separate enclosure attached by cable to the CPU, IBM said.

Access times average 126 msec at 1,500 rev/min for an effective data transfer rate of 199 kbyte/sec. The 5448 disk incorporates 400 cylinders and 1,600 tracks.

The 5448 costs $7,845 and rents for $310/mo or $264/mo under the 24-month extended term rental plan.

The disk will be available beginning March 1977, the firm said from the General Systems Division in Atlanta, Ga. 30301.

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Order information, including prices and a complete list of available equipment, can be obtained by writing to or calling Bob Purdy, Xerox Corporation, Data Systems Division, 701 S. Aviation Blvd. (A3-47), El Segundo, CA 90245. (213) 679-4511, ext. 1968. Order deadline is July 31, 1976.

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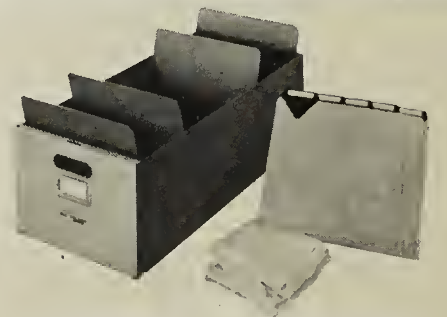

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'Little Machine' Helps Test Stresses on 'Big Machines'

MELROSE PARK, Ill. – A minicomputer is aiding the structural testing of earth-moving equipment produced by the International Harvester Pay Line Division here.

The earth-moving equipment must take punishment under all types of field conditions, according to Manfred F. Naujoks, chief engineer. The machines undergo a series of laboratory tests while in the prototype stage which identify structural weaknesses and provide engineers with data to use as criteria for future design work, he said.

Engineers perform tests at the division's Applied Mechanics Laboratory here and at the firm's proving grounds at Antioch, Ill., and Phoenix, Ariz.

Regular procedures include static and fatigue testing of main structural components in the laboratory and dynamic field tests under actual operating conditions.

A Digital Equipment Corp. PDP-11/45 computer is used to store and analyze data taken in the laboratory tests as well as data from the field tests, Naujoks said.

In performing stress analysis tests in the laboratory, Naujoks said, a machine's structure is subjected to a variety of stress cycles under the various load conditions encountered in the field.

Typically, stress is measured by strain gauges with the laboratory loading conditions applied by hydraulic means, he continued.

In the laboratory, strain gauge data is recorded from hundreds of gauges placed on the structural component of the loader. While strain gauges read in micro inches, the computer interface gives the engineer his values in the engineering units most useful to him, Naujoks said.

When the engineers complete the static tests, an operational machine is scheduled for dynamic tests at one of the proving grounds. Selected strain gauge locations from the static tests are used for this field test and measure the stresses on the machine as it is subjected to trials under field conditions.

The gauge signals from the working machine are obtained through radio telemetry. Signals are received, amplified and then recorded on magnetic tape with equipment installed in specially equipped vans.

As the machine moves through its tasks, these signals can be picked up as far as three miles away, Naujoks said.

The field test data is recorded on analog tape and sent to the Melrose Park facility for processing with the computers on site there. The strain gauge data is converted into digital form and analyzed using the Analog PDP-11/40 Hybrid computer system and the PDP-11/45.

The analysis provides histograms, structural life predictions, energy, statistical correlations and vibration analysis.

Kit Allows Users To Program Link For CA LSI Line

IRVINE, Calif. – Computer Automation, Inc. (CA) has a user kit that enables systems designers to program a standard interface to accommodate nonstandard peripheral devices on the firm's minicomputers, a spokesman said.

The standard interface is a general-purpose intelligent cable that contains a small I/O processor called a "Picoprocessor" which can be programmed to interface peripherals to CA's LSI family of minis, the firm said.

The kit enables the user to microcode and assemble programs that customize the standard GP Intelligent Cable with "minimum effort," the firm said.

The kit contains a user-microcode manual, a read-only memory/programmable read-only memory (ROM/Prom) generator program manual, a set of macro definitions on paper tape and a ROM/Prom generator on paper tape.

The complete kit costs $1,000; the Intellignet Cable costs $195 from the firm at 18651 Von Karman, Irvine, Calif. 92664.

Sharp Designs System For General Business

PARAMUS, N.J. – The System PC-2600 from Sharp Electronics Corp. is a desk-top programmable print/display calculator system for general business applications.

The system uses a 19K 16-bit word floppy disk and was designed around a microcomputer, the firm said.

Software for payroll, dealer bookkeeping and other accounting operations is available for the system, Sharp said.

The output printer's speed is 300 line/min, a spokesman added.

The system can perform basic chain and constant calculations; repeat addition/subtraction; and square root plus rounding down, up and off, Sharp said.

The system, including a dual floppy disk and an output typewriter, costs under $10,000, the firm said from 10 Keystone Place, Paramus, N.J. 07652.

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Micro Products

Imsai 8080 Gets Multiprocessor Logic

SAN LEANDRO, Calif. – Imsai 8080 computer users can now obtain multiprocessing capability, according to the vendor, IMS Associates, Inc. (Imsai).

Up to six processors can be connected to a single shared memory block (or several noncontiguous memory blocks) of an Imsai 8080 system, according to the firm. Each processor can operate independently or on a shared basis with one or more I/O peripheral devices, it added.

The processors access the shared memory on a priority basis. When two or more processors access the shared memory simultaneously, they are automatically sequenced according to a preprogrammed priority status, the company said.

The memory allotted each processor is 64K bytes.

The Imsai 8080 chassis has room for several processors, or each processor may be installed in a separate chassis with its own control panel, Imsai said.

Hardware required for the multiprocessor logic includes a bus multiplexing board ($399 assembled, $325 unassembled), a timing and control board ($305 assembled, $225 unassembled), and for each processor, a bus extension board ($65). Delivery is within 30 to 60 days from the firm at 1922 Republic Ave., San Leandro, Calif. 94577.

TI Unveils TMS 4036 Static RAM

DALLAS, Texas – Texas Instruments, Inc. (TI) now has a static random-access memory (RAM) for microprocessors.

Called TMS 4036, the 64- by 8-bit NMOS static RAM is said to suit such byte-oriented CPU systems as the TMS 8080 and TMS 9900.

TMS 4036 is intended to minimize cost/package count for terminal and controller systems requiring 128 words or less of RAM, the vendor said. Like the TMS 8080 and TMS 9900, this static RAM has a common I/Obus which is fully TTL-compatible, it noted.

The device interfaces directly with the TMS 8080, the firm added. Features on the static RAM facilitate memory expansion in a 64-word increment.

TMS 4036 comes in three speed ranges and is priced according to them. Prices in 100-piece quantities are: $5.67 for TMS 4036N (1$\mu$s); $6.24 for TMS 4036-1N (650 μs); and $6.80 for TMS 4036-2N (450 nsec access and read or write cycle time).

The static RAM is available from TI at P.O. Box 5012, MS/84, Dallas, Texas 75222.

SC/MP Kit Available from NSC

SANTA CLARA, Calif. –The SC/MP Kit from National Semiconductor Corp. (NSC) is based on the firm's SC/MP microprocessor introduced earlier this year [CW, March 15].

The kit is said to include all the firmware and components a user needs to build a working system for $99.

Included are the SC/MP micro, an 8-bit single-chip CPU housed in a 40-pin ceramic package; 512-byte read-only memory (ROM) preprogrammed to contain "Kitbug," a monitor and debugging program that assists in the development of the user's application programs; and two 1K-bit random-access memories.

Also included are a voltage regulater, an 8-bit data buffer, a timing crystal, a Teletype interface, a 72-pin edge-connector, a 24-pin integrated circuit (IC) socket for mounting the ROM, a 40-pin IC socket for mounting the microprocessor and one 4-in. by 5-in. printed circuit board, the firm said from 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Cramerkit Based on Intel 8080A

NEWTON, Mass. – Cramer Electronics is distributing a wirewrappable, socket packaging board designed by Augat, Inc.

The Cramerkit is based on the Intel Corp. 8080A microcomputer, Cramer said.

The board is color-coded so anyone assembling the kit can compare the colors and numbers on a large schematic drawing to the holes on the boards. The colors correspond to different function areas such as memory, I/O and CPU, a Cramer spokesman said.

The board is available in two versions. The unwrapped board costs $275 and the wrapped board $325 from the firm at 85 Wells Ave., Newton, Mass. 02159.

8-Bit Unit Bows

DALLAS – A complete 8-bit microcomputer on a 4.5-in. by 6.5-in. card is available from Pronetics Corp.

The Model 810 contains a Fairchild F8 microprocessor, 1K bytes of random-access memory (RAM), 1K bytes of firmware and 32 bidirectional I/O ports.

The $179 system is memory expandable with programmable read-only memory, RAM, cassette program loader modules and a terminal interface, from Box 28582, Dallas, Texas 75228.

Hobbyist, Industrial, Educational Users Get Microcomputer

DERBY, Conn. – Mini-Micro Designer from E&L Instruments, Inc. was designed for the educational, industrial and hobbyist user.

The system is based on Intel Corp.'s 8080 microprocessor chip. A memory card featuring 1K of read/write memory is included with the system, E&L said.

The system costs $125 from the firm at 61 First St., Derby, Conn. 06418.

Articles on Micro Design Published as Paperback

ROCHELLE PARK, N.J. – *Microprocessors: New Directions for Designers*, edited by E. Torrero, is a collection of articles from *Electronic Design* magazine on microprocessors.

The 144-page paperback book costs $8.95, a spokesman said from Hayden Book Co., Inc., 50 Essex Street, Rochelle Park, N.J. 07662.

Dr. Dixon Doll will show you how to plan and manage effective data communications systems.

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2. **Data Communications Course #1020 — Advanced Teleprocessing Systems Analysis and Design.** Course 1020 will give you an in-depth familiarity with techniques for planning, designing and managing cost-effective commercial data communications networks. Class study and discussion of specific telecommunications problems affecting your organization is an important part of this three-day seminar, and you'll have the opportunity to present such problems for analysis by the instructor and class members. You will also participate in project teams assigned to individual data network case studies, and you'll see what approaches have been taken by other organizations with networking problems similar to your own.
Like Course 1010, this seminar will focus on recent developments in data communications. But Course 1020 will concentrate on greater depth and detail. It assumes that attendees are already involved with and experienced in data communications networks, and that they desire very detailed knowledge in the field. Emphasis will be placed on thoroughly examining contemporary cost-reduction networking ideas, along with specific procedures for implementing them. Design problems associated with terminal selection and line organization will be addressed in detail as they apply to recent developments like SDLC, satellite transmission and integrated multiapplication nets. Algorithims for determining line speeds, number of ports and the optimum mix of WATS and DDD for switched nets will also be examined. This seminar will give you the ability to perform your own design calculations, and it will enable you to recognize areas in present (or proposed) systems where cost savings are possible. And you will gain practical mastery of the techniques you need to realize these savings.

Dr. Dixon R. Doll is the Seminar Leader

Dixon R. Doll received his B.S. degree in Electrical Engineering (Cum Laude) from Kansas State University, and as a National Science Foundation Scholar he received his M.S.E. in Electrical Engineering and PhD in Systems Engineering from the University of Michigan. Dr Doll has extensive experience with equipment vendors and users. He is the principal architect of the Communications Network Configurator, a family of computer programs used by the Raytheon Data Systems Company to design and analyze end-user computer-communications networks. As Head of DMW Telecommunications Corporation, which he founded, he designed Household Finance Corporation's North American Orbit network, involving more than 2700 terminals and 10 concentrators throughout the U.S. and Canada. He has developed teleprocessing network analysis software for many other major organizations, including Burroughs Corporation, IT&T, MCI, Procter & Gamble, Sun Oil, Texas Instruments and VWR Scientific Corporation. He is also a visiting staff member at the IBM Research Systems Institute in New York, where he teaches courses on data communications fundamentals, teleprocessing network design and resource sharing computer networks. Dr. Doll, a founder and Technical Director of the International Communications Corporation's ICC Institute in Miami, will lead the entire seminar.

Charges and Enrollment

The charge for Course 1010, a two-day seminar, is $350 per registrant, and $300 for additional registrants from the same company. The charge for Course 1020, a three-day seminar, is $450 per registrant, and $400 for each additional registrant from the same company. Both seminars include continental breakfasts, luncheons and all course materials at no extra charge. Hotel rooms, if necessary, are not included, but we have reserved space at the seminar hotels for attendees who wish them.

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COMPUTER INDUSTRY

CI Notes

Wema Sees Semi Shipments At $5 Billion This Year

PALO ALTO, Calif. – Shipments of semiconductors in 1976 could reach a record $5 billion, a 24% rise over 1975, according to a "Semiconductor Forecast" published by the Western Electronics Manufacturers Association (Wema).

For the first time, shipments of integrated circuits are expected to exceed shipments of discrete devices, totaling $2.5 billion compared with $2.4 billion respectively, Wema said.

Worldwide semiconductor shipments during 1975 were $4.02 billion, a decline of about 17%. The total is expected to rise to $5.9 billion in 1977 and $6.6 billion in 1978, the report indicated.

DP Makers Improve Energy Use

WASHINGTON, D.C. – The Computer and Business Equipment Manufacturers Association (Cbema) led 31 other groups in improvement of energy efficiency, according to a report from the Office of Energy Policy and Programs, U.S. Department of Commerce.

The reporting Cbema members compiled a 30.5% improvement in the ratio of BTUs per 1,000 sq ft of utilized space.

Data 100 Sells Iomec Lines

MINNEAPOLIS – Data 100 Corp. has sold the assets of its paper tape 'Portaverter' product line and magnetic tape cartridge product line as well as the trade name "Digitronics" to a new Rhode Island company, Comtec Information Systems.

Comtec will continue operations in the plant at Cumberland, R.I. and will employ 60 former Data 100 employees. It is headed by Alfred J. Petteruti, former Data 100 vice-president and chairman of Odec, Inc., which Data 100 acquired in November 1974.

The product lines were produced by Iomec, Inc., which was acquired by Data 100 last September, and are not directly related to Data 100's primary line of terminals, the firm said.

Terms of the sale involving cash and notes were not disclosed.

In addition, Data 100 is choosing its 25,000 sq-ft plant in Westbury, N.Y., obtained in its 1971 acquisition of Compat, Inc. in 1971. The closing will affect 12 employees.

Supershort

Applied Digital Data Systems, Inc. (Adds) has begun shipments of its Consul 520 terminal for which it has received over $1 million in orders since its introduction.

Speedier Recovery Seen

DP '76 Shipments to Near $13 Billion

By Molly Upton
Of the CW Staff

WALTHAM, Mass. – The computer industry should recovery from the recent recession faster than previously expected, according to the "Review & Forecast" issue of *EDP Industry Report* (EDP/IR) published by International Data Corp. (IDC) here.

EDP/IR forecast an increase in total worldwide computer shipments from the U.S. from over $11.5 billion in 1975 to nearly $13 billion in 1976.

The "net add," or shipments minus retirements, will reach its highest percentage of shipments this year since before the 360 to 370 conversions, the report predicted.

As a result, about $123.5 billion worth of U.S-made computers will be installed worldwide by 1980, the report said.

Although EDP/IR confessed U.S. shipments of general-purpose mainframes in the near future will be lower than it forecast previously, it said they will also be less cyclical.

The change in forecast resulted from IBM's apparent strategy of continuing "the staged introduction of nonrevolutionary new equipment," EDP/IR said. This means lower system retirements and a higher than normal percentage of user purchases, it explained.

Two Classifications

IDC classified computers into two categories – general-purpose and dedicated-application. The latter category includes minis and certain larger systems designed primarily for one application such as process control, communications or data entry.

Minicomputers will play an increasingly dominant role in this category; in 1975, mini revenues were 85% of this group's shipments and by 1980 they should be 98%, IDC said.

In 1975 the total installed worldwide base of U.S. shipments was $62.1 billion; it is expected to reach $71.7 billion this year, according to EDP/IR.

Within the U.S., the total base during 1975 was 211,900 systems of $37.8 billion. This was projected as growing to 270,500 systems or $43.1 billion in 1976 and to 680,000 or $70.7 billion in 1980.

International Shipments Good

International shipments of general-purpose computers in 1975 were better than expected, EDP/IR said, adding it expects shipments to grow 10% in 1976 and then 14% to 15% annually for the rest of the decade.

During 1975 the international base was composed of 112,700 units valued at $24.3 million. This base should reach 145,300 units or $28.6 billion in 1976 and climb to 419,000 units or $52.8 billion by 1980, according to EDP/IR.

Worldwide shipments during 1976 should be 104,300 systems, of which 72,800 will be in the U.S., the report said.

In 1980, worldwide shipments should total 225,000 units; 150,400 will be in

(Continued on Page 72)

Mini Mart Growth Recovering; '80 Revenues to Hit $5 Billion

WALTHAM, Mass. – The growth rate of the minicomputer market, which dropped about 50% between 1974 and 1975, should regain nearly half that distance with revenues reaching $1.9 billion in 1976, according to the *EDP Industry Report* (EDP/IR) "Review and Forecast" issue.

Revenues from this sector should approach $5 billion in 1980, the report said.

During 1974 the minicomputer market's growth rate was 62%, but this plummeted to 27% in 1975, when revenues totaled $1.4 billion.

Over 80% of the mini system revenues in 1975 came from the mid-range mini, but by 1980 superminis of the Digital Equipment Corp. PDP-11/70 class will account for 37% of system revenues, EDP/IR said.

Mid-range minis will account for 54% by then, it added.

As minis increase in sophistication, service revenues will account for 20% of all mini revenues in 1980, up from 13% in 1974, according to the report.

With the change in minicomputer applications, by 1980 small business computers will use over half the minis shipped compared with the current quota of one-third.

DEC and Hewlett-Packard Co. (HP) ranked first and second respectively in both minicomputer revenues and units shipped during 1975, EDP/IR said.

But from there the rankings changed according to whether the criteria was revenues or units.

DEC gained 37% of the estimated total $1.35 million in revenues for the worldwide mini market, while HP had 18%. From there the drop was rather sharp to Data General Corp. (DG), 8%; Honeywell,

(Continued on Page 72)

Time-Sharing Firms Go Abroad

By Molly Upton
Of the CW Staff

Several U.S. remote services firms have been busily expanding facilities and networks abroad. For some the sole motivation has been to accommodate large U.S.-based multinational customers.

For many, however, the effort has been made with a dual goal: serving existing U.S.-based multinational customers as well as gaining business from foreign-based firms.

Some firms maintain communications links with points in Europe while others have set up local DP centers in addition to links with the U.S.

Started With Locals

Richard Crandall, president of Comshare, Inc., said his firm originally started out with the approach of installing local data centers staffed by citizens of the respective countries.

Part of the reason for setting up local installations was that the use of computers varied from country to country and, in some cases, there was a vested interest in keeping data within a particular country, he said.

Comshare put a center in Canada in 1969 and now has centers in France, the UK, Japan, Belgium and Holland.

Having local sites has helped Comshare obtain some government business, he said.

Comshare's overseas expansions were motivated by "early customer pressure," Crandall said, and "it seemed clear that major time-sharing companies would have to meet international requirements."

Foreign operations contribute better than one-third of Comshare's total revenues of about $25 million, he said.

Comshare's Belgian and Dutch facilities were opened within the past 15 months, offering links to the UK and U.S. The transatlantic cable link is between London and the U.S.

In France, the local center is run through a licensee, Telesysteme, which offers Comshare Commander I service as well as a link to the UK.

The Japanese center in Tokyo is "difficult for us but we're slogging through it," Crandall said. The center was opened

(Continued on Page 72)

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Remote Services Firms Busy Expanding Nets Abroad

(Continued from Page 71)

under a joint venture with Miroku and has proceeded slowly, he said.

Comshare has increased its ownership to 30% and is looking for additional financing for the Japan operation, he said. The computer operation is doing fine and revenue progress has been made, he added.

Control Data Corp. has 50 Cybernet computer centers in Canada, Mexico, South America, Europe, Australia, South Africa and the Near East, a spokesman said.

There are six centers offering only batch services in Europe; the recently opened Brussels center provides time-sharing capabilities within Europe as well as a link with the CDC center in Rockville, Md.

Brussels has one Cyber 70/73, and plans call for an additional one as well as a couple of IBM machines, he said.

The European centers are interlinked, he said. CDC has been servicing Canada from the U.S., but opened a center there as well.

The business abroad is growing at a faster rate than domestically, the spokesman observed, noting much of the demand is for scientific engineering.

Tymshare May Expand

Tymshare Corp. has network locations in Brussels, The Hague, Lausanne, and overseas affiliates of Cegos-Tymshare and Tymshare-UK in Paris and London, respectively.

Tymshare started its European ventures in 1969 with a center in Paris and added a cable link to the U.S. in late 1972, the spokesman said.

In 1974 it added a second cable and also expanded to London in conjunction with a division of Unilever Services Ltd.

The firm is investigating expanding into other countries, he said.

Although revenues from European operations are not a large portion of Tymshare's overall revenues, they have been growing at a respectable rate, he added.

The operations in both Paris and London have been growing faster than originally projected, he said.

U.S. Packages Popular

Several vendors affirmed that packages developed in the U.S. for various applications are readily transferrable and popular.

APL Services, Inc. initiated a link with Europe less than a year ago in order to provide additional services to a multinational customer, a spokeswoman said. It maintains a satellite link to its data center in Richmond, Va.

On-Line Systems, Inc. offers both local and remote capabilities to its users through a facility in London acquired last fall from Leasco Response UK, a spokesman said.

To the installed Hewlett-Packard gear, On-Line added a Digital Equipment Corp. PDP-11 which is linked via satellite to another PDP-11 in Pittsburgh and then to a Decsystem-10, he said.

Overseas business should account for 25% to 30% of total revenues this year at ADP Network Services Division, according to Ken Draeger, executive vice-president.

ADP has links with Holland, Germany, Italy, Switzerland, Belgium and England as well as four Decsystem-10s in London, which it is integrating into its network.

The firm, formerly Cyphernetics, Inc., has been in Europe about two years and growth has been "very good," Draeger said.

Two months ago it achieved a profitable position with its links.

DP Shipments to Near $13 Billion in '76

(Continued from Page 71)

the U.S. The installed worldwide base should reach nearly 1.1 million systems in 1980, IDC said.

Shipments of general-purpose computers will reach a peak in 1977 at 38,000 units and dwindle to 33,000 by 1980; the dedicated-application sector's shipments, however, will grow from 76,000 in 1976 to 192,000 in 1980, according to the report.

The differences in installed base value between the two types of systems is large, EDP/IR said. The value of the general-purpose base should continue to climb to $100 billion by 1980, while the dedicated-application group's value will reach $23.5 billion by 1980.

Revenues from computer services by 1980 will be just under $8 billion, the report continued.

EDP/IR set service companies revenues at about $3.1 billion this year and forecast a trend toward increased remote access services and transaction processing.

For the first time, this year less than half the services revenues will come from straight batch processing, the report indicated.

Terminals by 1980 will represent a user investment of almost $25 billion, of which about $20 billion will be shipped in the next five years, according to the report.

Mini Market Recovering Growth

(Continued from Page 71)

5%; and General Automation (GA) and Texas Instruments (TI), which tied with 4%.

DEC shipped 32% of the 51,000 estimated units shipped while HP had 12%, followed by Computer Automation with 10%.

DG ranked fourth with 9%, while GA and TI again tied, with 5% each.

Charting the progress between 1974 and 1975 revenues, HP was second only to Control Data Corp., which scored a 100% increase with $30 million.

HP had a 57% increase with revenues estimated at $235 million.

Modular Computer Systems, Inc. (Modcomp) was another star performer compared with its year-ago revenues, chalking up a 46% increase with $38 million in revenues.

Interdata Corp. scored a 30% improvement while Raytheon had 28% and DEC 27% over their year-ago revenues.

However, GA marked an 8% decline in its revenues, which totaled $59 million.

International Data Corp. (IDC), publisher of EDP/IR, defined minis as being general-purpose by design and sold as a tool, not just a solution. A mini is available as a system with operating software and periherals and is offered with OEM discounts; it is generally sold, not leased, IDC said.

A mini has random-access memory of 4K words or more and costs less than $25,000 in base price or is sold in a family with some members which are under $25,000 in base price, according to IDC's definition.

The $4.4 Billion German Computer Market And How To Reach It:

The German computer market is the largest in Europe and the third largest in the world. In 1976, German computer users will spend an estimated $4.4 billion for data processing. Studies show that the 5,000 largest EDP user sites account for 65% of this spending, so like the United States, Germany's computer market is highly concentrated in the larger, professional computer sites.

IDC Deutschland (one of Germany's largest market research and consulting firms) projects that the average growth rate of computer systems sales in Germany will be 14% through 1977; but the growth of certain segments of the market will be much greater. The rate for minicomputers and data communication terminals will be more than 30%. Software and services will experience an annual increase of 20-30%, while data entry equipment is expected to show a sales increase of 25% per year.

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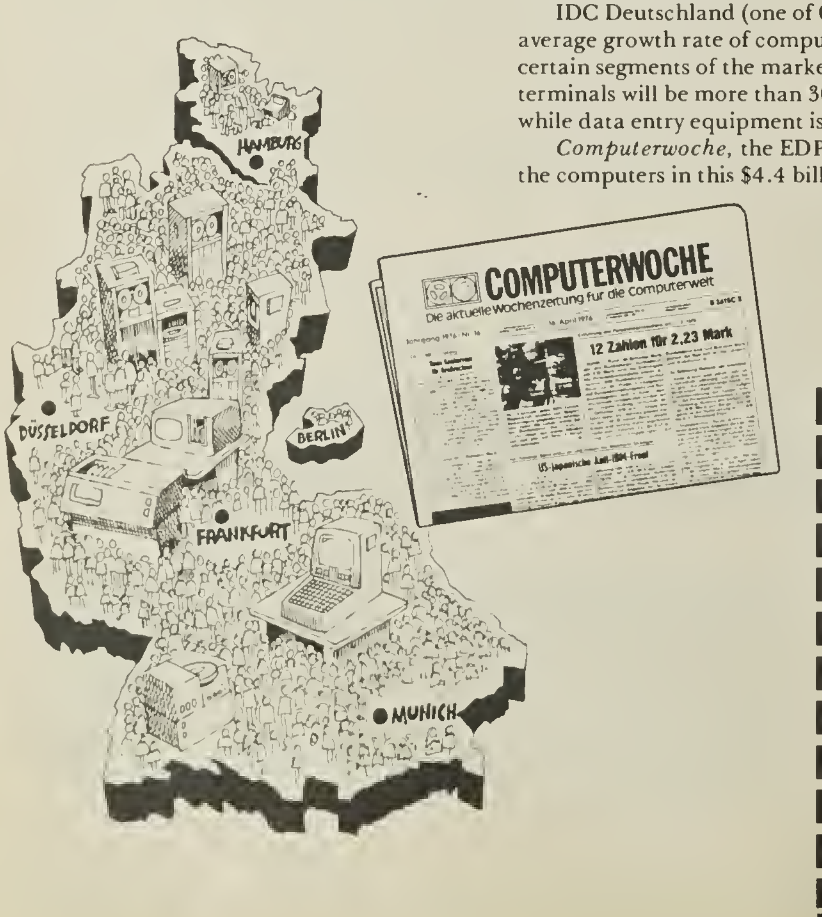

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Tab Finds Sales Rising, Leases Down

By Molly Upton
Of the CW Staff

PALO ALTO, Calif. – The purchase/lease ratio is rising at Tab Products Co.'s Data Entry Products Division, according to Dave LeMieux, national marketing director.

However, it is difficult to determine whether this is attributable to a trend in the marketplace or to Tab's recent efforts to stress sales rather than leases, he said.

A year ago, all of the division's business was on a lease basis; now 12% to 15% of orders are sales, he said.

LeMieux suggested one reason might be Tab's Model 501 buffered "data entry microprocessor," which the firm is marketing on a special-order basis.

Third-Party Interest

Another factor contributing to the increase in sales is recent interest by third-party lessors in buffered keypunches, LeMieux said.

Most of these firms restricted purchases of buffered keypunches because they were expensive and the lessors weren't sure how fast customers would convert to other data entry methods, he explained.

Tab sells used Model 400 buffered keypunches at less than the cost of an IBM 029, he said.

About 25% to 30% of Tab's production is going to Europe, which also is on a sales basis, he added.

In addition to taking Tab into the custom market, the 501 seems to be generating leads for its other products, LeMieux said. Tab has principally marketed to the end user, but has been approaching the OEM with the 501.

Tab is finding OEMs interested, but they seem to prefer to refer their customers to Tab because they worry about servicing the Model 501, LeMieux said.

LeMieux expects the proportion of 501s interfaced to other components to grow.

Tab's keypunches, which it began making about four years ago, now account for one-fifth to one-quarter of the firm's total revenues, he said. The other product lines are media and office equipment such as file cabinets.

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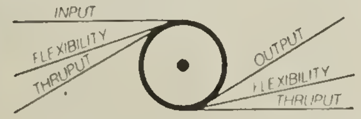

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Pertec Division Reports Tape, Disk Business Booming

By Esther Surden
Of the CW Staff

CHATSWORTH, Calif. – Business is booming at Pertec Corp.'s Peripheral Equipment Division here, according to Ralph Gabai, division vice-president of marketing.

The tape business is growing at a rate of 5% to 10% per year projected to 1980 and the disk business is growing even faster – 30% to 40% projected to 1980, Gabai said.

Tape will represent 55% of the division's business while disk will represent 45% during the next year, he added.

Of the disks, 20% of the business is in floppies, he added.

The trend in disks is toward higher capacity and higher performance to meet the needs of "midi" systems, Gabai said.

Since users seem to be migrating to larger, higher performance machines, disks should follow, he remarked.

All products recently introduced seem to be in high demand, Gabai said, allowing the firm to grow and increase its share in the terminal and data entry markets, in which it did not previously compete.

More traditional markets include the large end of the minicomputer line, such as the Interdata 8/32 and Digital Equipment Corp. Decsystem-20, he said.

The trend toward vertical integration by mini makers will peak and then slacken, Gabai predicted.

In the next year, the rate of consumption on the part of the mini makers will drop 15%, he said, but companies like Pertec will survive.

"As big computer companies in the '60s developed a large degree of vertical integration and then realized they couldn't afford to develop their own peripherals, the mini makers will also discover this," he said.

What these manufacturers may save in sales or profits, he continued, they may lose in financing, engineering and overhead.

Compatibility the Theme

The main theme in all of Pertec's offerings is the compatibility of the members of the product line family, according to Donald J. Rutherford, product manager of tape and flexible disk.

All of Pertec's offerings, including hard disks, have fulfilled the compatibility criteria, he said.

The flexible disk filled a bottom area that the 7-in. tape couldn't fill, Rutherford explained, because the 7-in. tape never broke the $1,000 price barrier.

Pertec's tapes are not in the 3M cartridge market and the Philips cassette market, he said, noting the firm has stayed within the Ansi standard or IBM standard market.

"The consumer electronics market is one market that has not been filled by anyone," Rutherford said. "There is still a need for a lower cost type of device to fill this need.

"But the need for greater performance has led us into other products for the higher market end," he added.

The firm has 300 active OEM customers, none of which has greater than 4% of the firm's business, Gabai said.

In disks, the firm also emphasizes the "family of products" approach. The OEM customer can interchange many parts and therefore doesn't have to keep a great number of parts in stock, Ron Dorner, disk product manager, said.

"We try to give our customers more capacity for less money," Dorner said. "You can assume if our line has ranged from 3M- to 24M bytes, it will go to 50M bytes."

One way to do this would be to expand the present technology to its limits. Using existing technology produces less problems and a minimum of maintenance for the OEM's convenience, Dorner said.

Another way to reduce price is through expanding the manufacturing capacity and emphasizing commonality of parts.

"We try to be compatible for our own benefit," Dorner said, "because labor costs increase 5% per year no matter what happens. But if we have commonality, there is less labor needed."

CMC, Now Pertec Unit, Also on Upswing

By a CW Staff Writer

CHATSWORTH, Calif. – CMC, a division of Pertec Corp., is also experiencing an economic upswing, Peter Zinsli of corporate planning said in an interview here recently.

The company, located in Marina Del Rey and formerly known as Computer Machinery Corp., was acquired by Pertec in March.

"Business had been slow for the 18 months prior to October of 1975," Zinsli said, "but it has been steadily increasing lately."

The firm makes turnkey key-to-disk and remote job entry equipment based on minicomputers. Its installed user base is 1,600 systems, and CMC claims 32% of U.S. key-to-disk business, Zinsli said.

The systems are sold to end users only and business is 90% lease, he added.

CMC users are usually IBM 370/135 or larger shops, he continued. The firm competes with the IBM keypunch replacement business of such firms as Inforex, Mohawk Data Sciences, Entrex and Univac, he noted.

Firms Combining Activities

With the acquisition by Pertec, CMC and Pertec are combining developmental and marketing activities, Zinsli said.

The primary thrust in product development this year has been in making a usable sophisticated machine from the standpoint of error detection and reliability, he said. About half of the development time is spent testing, he added.

Trends for the future include rapidly changing communications software, Zinsli said. "There is an increased use of communications in these systems," he continued, that includes the eventual conversion of everything to IBM's Synchronous Data Link Control protocol.

This has been happening more slowly than predicted, he added.

Prices in the key-to-disk arena should not increase in the next several months, Zinsli predicted, but more capabilities may be added to the products with prices kept stable.

Users tend to move to key-to-disk systems in an effort to reduce costs and improve capabilities. The primary concern of the user is reliability, he said.

"With our systems, over 99% of the time the user wants to use them they are available for use," Zinsli claimed.

Users also want a machine to increase their control over entry and the quality of output; they need a system that gives the data with "batched integrity, that is that all of it is there, is verified and it doesn't get transferred more than once," he said.

In addition, users want a system that can be put to use without programming, he explained, noting firms generally don't have programmers to spare for the data entry applications. CMC provides both hardware and software, he added.

The CMC system does things in "a very structured way so it can be used immediately. It takes significantly more sophistication to make it simpler," Zinsli said.

Service is handled by 300 customer service representatives, he said.

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Sealed proposals will be received by the CDPA, 508 Robert E. Lee Bldg., Jackson, MS 39202, up until 2:00 p.m. 6-14-76 for the following data processing equipment:

Request for Proposal No. 247 for the purchase of a payroll system capable of performing in a multi-agency environment on an IBM 370/155 operating under OS/MVT.

Request for Proposal No. 248 for the purchase of a personnel management system capable of performing in a multi-agency state government environment on an IBM 370/155 operating under OS/MVT.

Request for Proposal No. 249 for the lease or purchase of a small scale disk file oriented computer system with COBOL language capability.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities. Clyde P. Ballard, Executive Director, Central Data Processing Authority.

DP-Generated Guide On Option Trades Set

LOS ANGELES – Weekly computer-generated data on option trades will be available to the small investor for $98/year, according to the institutional brokerage firm of William O'Neil & Co.

The *Stock Option Guide* will contain graphs displaying 40 factors about each stock underlying a listed option and an 11-factor data box about each option itself, the firm said from 10960 Wilshire Blvd., Los Angeles, Calif. 90024.

Expansions

Univac has expanded its marketing and service office in the Woodbridge Center Office Building at Katella Ave. and State College Blvd. in Anaheim, Calif.

Applied Devices Corp. will move its manufacturing operations and associated production engineering and supervision operations to a 105,000 sq-ft plant in Orlando, Fla.

American Datacenters, Inc. has moved to larger facilities at 15302 Bolsa Chica Road, Huntington Beach, Calif.

Hewlett-Packard Co. plans to expand its Colorado operations to include a research laboratory and manufacturing plant in the Fort Collins area.

Centronics Data Computer (Canada) Ltd. has opened a field and depot service operation in Mississauga, Toronto, Ont.

Vydec, Inc. plans to move its corporate headquarters and manufacturing operations to a 77,500 sq-ft building at Suburban Mall, Vreeland Road, Florham Park, N.J.

Interactive Data Corp. has opened an office in the Bond Court Building, 1300 East 9th St., Cleveland, Ohio.

Data General Corp. has purchased a 105,000-sq-ft building and 50 acres of land in Portsmouth, N.H., and plans to establish metal fabrications there by mid-summer.

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Distributor of Terminals Using 'Sears Approach' Sees '76 Best Year Yet

By Molly Upton
Of the CW Staff

SAN FRANCISCO – International Computer Equipment, Inc. (ICE) expects its best year ever in 1976, according to President Peter M. Barzo.

The firm, founded in 1970 on $2,500, expects to report revenues of $8 million to $9 million this year, he said. In 1975 the firm's revenues reached $5 million.

ICE has been profitable since a year after it was founded on the idea of emulating the "Sears' approach" to distributing a line of terminal gear, Barzo said.

Taking the department store's approach, The firm stocks terminals and printers from seven vendors: Digital Equipment Corp., Interdata, Inc., Texas Instruments, Inc., Applied Digital Data Systems, Inc., Lear Siegler, Inc., Datapoint Corp. and Tally Corp.

ICE buys on the vendors' maximum discount schedule and therefore can offer the units to users at a lower cost than some of the vendors can, he said.

Between 80% to 90% of ICE's business is with Fortune 500 companies, Barzo noted. These firms procure terminals through ICE because it offers counseling on which terminal fulfills their needs.

Dealing with a single source for various terminal needs represents a time savings for customers' buyers, he observed.

In addition, ICE offers quick delivery of terminals because of large inventories, he said.

Over half the firm of about 50 persons is comprised of service personnel.

ICE has about 7,000 terminals installed, he said, and maintains most of them. "Service is pretty much a numbers game," he observed, adding the service sector is approaching profitability in its own right.

ICE also procures, when possible, national service contracts with the vendors. It is also investigating having a third-party service organization handle units in remote locations, Barzo said.

The firm has an exchange program in which a user can ship a terminal back to ICE and obtain a new one by air freight, he said.

Maintains Big Inventory

Contributing to ICE's ability to quote fast delivery to customers is its inventory, which ran between $700,000 and $800,000 last year, Barzo said.

This year he expects inventory to be over $1 million. "It's a cost, but it's worth it," he said.

The maximum delivery time the firm quotes is 30 days, he added. "This is very important to the customer and gives us a competitive edge," he said.

The firm is working on getting a closer view of its inventory forecasting, switching a management information system from a Datapoint system to a DEC PDP-11.

Barzo said he hopes to have daily order entry on-line by June. As the system matches forecasts of sales with deliveries, it can schedule vendors to drop shipments at certain points, he said.

ICE's principal warehouse is in Los Angeles, but the firm also stocks equipment in New York and Chicago, where it has offices.

Careful to Show Profit

When the firm was founded, it envisioned someday either going public or being acquired, so it has been careful to show a profit each year and to have its books audited by a large certified public accounting firm, Barzo said.

Citing ICE's assets, Barzo said the firm has national marketing and service organizations and is a leasing company with a large portfolio.

Part of its business plan was that there would be a good market for used equipment, and that prophecy is coming true, he said. Also, it forecast shortages of parts and deliveries.

The amortized equipment that it has out on lease will contribute to profitability this year, he said. ICE owns about 500 terminals outright and will own 1,500 to 2,000 by the end of the year.

ICE puts the older ones out on short-term lease, he said, and handles the lease paper on some of its leases to large firms; the rest is through a third-party lessor, with the equipment returning to ICE at the completion of the long-term lease.

Signetics Makes Gift To New York Institute

SUNNYVALE, Calif. – Signetics Corp. has donated over $250,000 worth of CMOS integrated circuit technology to the Polytechnic Institute of New York.

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405 Lexington Avenue
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428 Forbes Avenue
Pittsburgh, Pennsylvania 15219
PROVIDENCE
Xavier Associates, Inc.
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SAN FRANCISCO
The Computer Resources Group Agency, Inc.
303 Sacramento Street
San Francisco, California 94111
SYRACUSE
CFA Associates Personnel, Inc. (Agency)
2530 James Street
Syracuse, New York 13206
TULSA
Data Processing Careers, Inc.
Suite 10, Park 21 Building
2626 East 21st Street
Tulsa, Oklahoma 74114
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PROGRAMMER ANALYST

NCR Century small installation in manufacturing company in Western Mass. Require knowledge NEAT 3, operating software and 3 years experience, including accountingand manufacturing applications. Salary range to $15,000-depending on experience. Send resume in confidence to:

CW Box 4660
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The United States
Coast Guard Academy
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Division of Academics,
Department of Computer Science

Has an opening for a teaching faculty position in Computer Science beginning Fall Term 1976. Involves teaching introductory and advanced Computer Science courses at the undergraduate level. PhD in Computer Science, Mathematical Sciences, or related field required. Academic rank commensurate with qualifications.

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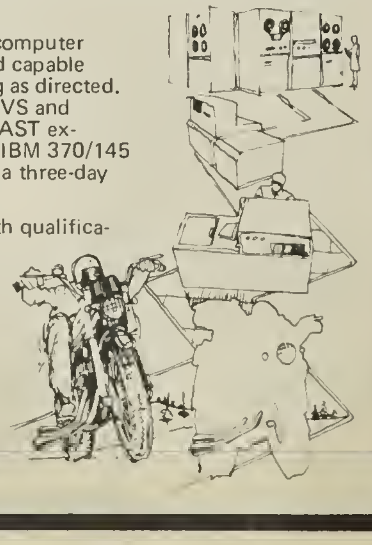
- **SENIOR PROGRAMMERS**
  3 years programming experience, using IBM 370 computer equipment with knowledge of ANS COBOL, DOS/VS, DOS/VS JCL, POWER/VS JECL, VSAM, and LIBRARIAN. DL/I or IMS candidates will be given preference.
- **JOB SETUP COORDINATOR**
  1-2 years experience in assembling of data files, processing control instructions, and run instructions for processing of jobs in accordance to daily and shift work schedules. Knowledge of tape library and data control functions with complete knowledge of DOS/VS JCL and POWER/VS JECL mandatory.
- **COMPUTER OPERATOR**
  2 years experience operating IBM 370 computer equipment. Candidate must be alert and capable of recognizing problems and responding as directed. Must be thoroughly familiar with DOS/VS and JCL, POWER/VS JCL, and DITTO. TFAST experience desirable. Current hardware is IBM 370/145 with 3330's. Person selected will work a three-day week (twelve-hour shift).



If you are a growth oriented individual with qualifications to satisfy any of our new positions and enjoy working with other professionals in a dynamic, people-oriented company, forward your resume and salary history to:

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Kawasaki Motors Corp. U.S.A.
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Information systems organization has outstanding openings for hardware planning and evaluation analysts. Positions offer the potential for rapid career advancement. Preference will be given to those with 3 or more years of experience in the following:

1. Match of communications oriented hardware to user information needs.
2. Evaluation of competitive hardware and software.

Education should include a BS degree in Computer Science or the equivalent in experience.

Send resume to:
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B-1 Division
Rockwell International
5701 W. Imperial Highway
Los Angeles, Calif. 90001

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Senior Systems Programmer

Major Washington area communications company has an immediate opening for a Senior Systems Programmer.

Qualified candidates must have several years experience with IBM S/360 or S/370 utilizing DOS or OS, ALC (including self-relocating and re-entrant procedures), multi-taskings, data base design and implementation (demonstratable knowledge of queuing techniques and indexed ad direct access file structures), teleprocessing (BTAM) and online VDT transaction processing. Experience with text processing on S/360 or S/370 particularly in a newspaper, and mini computers attached to S/360 is desirable.

We offer excellent salaries and benefits. Interested applicants send resume with salary history in confidence to:

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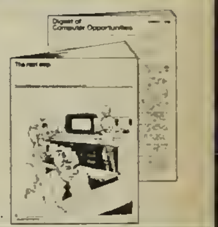

"The Next Step", Source Edp's tenth annual salary survey and career planning guide, is now available. You'll also receive without charge our latest "Digest of Computer Opportunities" describing specific career openings currently available within our client organizations nationwide.

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Or call your nearest Source Edp Office:

East: Boston (617/237-3120), New York-New Jersey (201/687-8700), Philadelphia (215/665-1717), Washington, D.C. (703/790-5610).

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South & Southwest: Atlanta (404/634-5127), Dallas (214/638-4080), Fort Worth (817/338-9300), Houston (713/626-8705), New Orleans (504/523-2576).

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If your field is computing—Tom Ahern's computer background can help you in your career advancement. Prior to joining Source Edp, Tom was a Senior Consultant with Ernst & Ernst. He also served as a Senior Systems Analyst with Control Data Corporation. He gained his initial exposure as a Naval Officer in Washington in a variety of computer positions which included the supervision of a systems development team in the Pentagon. He holds a B.A. degree from Johns Hopkins University.

If your field is computing—get to know Tom Ahern. Whether you're interested in a position change right now or just want to discuss your career objectives in general, call or write Tom Ahern this week in confidence—he's the person each computer professional should know.

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The Systems Analyst we seek should have 2-4 years of IMS Data Base management concentrated in security/recovery/D.B. design and Data Communications. Heavy IMS D.B./D.C. systems design experience essential. Experience with data dictionary is highly desirable.

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Please forward a detailed resume including salary history and requirements and indicating specific position in which you are interested, in confidence to:

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SCHERING-PLOUGH CORPORATION

Personnel Department
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Growth-opportunity-advancement-promotion, Familiar words? At PARKE-DAVIS in Detroit, Michigan opportunities are a reality. Health care is truly a growth industry. Management Information Systems is broadening it's horizons resulting in new career opportunities.

We are looking for degreed Programmers and Analysts in these areas:

Order Processing & distribution
Marketing
Support programming

To qualify you must have experience in large scale communications and data based, OS/VS systems. Languages include Cobol and PL/1 on IBM 370 equipment.

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You should have systems background with:

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For further information send resume in confidence to J.F. SWARBRICK or CALL COLLECT: J.P. MARLOW

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You must be a self-starting and capable individual with a minimum of 3-5 years experience with mini-computers such as the Varian 73 and Interdata. Your responsibilities will include installation and maintenance of the equipment for our international data communications network. 20% travel required.

For further information send resume in confidence to, or CALL COLLECT: D.E. JOHNSON

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SR. PROGRAMMER/ ANALYST

If you can help take us from 1401 to 370, we can take your career steadily upward.

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Qualifications should include a BS degree or equivalent, and a strong background that includes work in payroll and personnel, labor reporting, procurement and manufacturing systems, as well as tape and disk experience.

We offer an excellent starting salary, comprehensive benefits with liberal relocation assistance to our outstanding Midwest location which provides ideal living conditions.

Please send resume, including salary history, to Mr. Larry Haynes, ITT Aerospace/Optical Division, 3700 East Pontiac Street, Fort Wayne, Indiana 46803.

AEROSPACE/OPTICAL ITT

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We are an expanding commercial division of an internationally known corporation with worldwide annual sales in the high 8-figure range.

Our MIS Department is seeking highly motivated and qualified professionals to join a systems-oriented staff. We offer a salary fully commensurate with your experience, ability and education, including a generous employee benefits program.

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The individual we seek must have a minimum of 5 years programming experience in ANS COBOL, with 2 years in an OS environment.

Must possess a good working knowledge of financial applications, with 1-2 years experience in systems design.

Specific functional responsibilities will be in the areas of PAYROLL, GENERAL LEDGER, and ACCOUNTS RECEIVABLE.

BA/BS Degree or equivalent experience desirable.

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The individual we seek must have a minimum of 3 years ANS COBOL programming experience with at least 1 year in an OS environment. Specific assignments will be in the areas of marketing and sales applications with emphasis on the installation of a nationwide Order Entry System. BA/BS Degree or equivalent experience desirable.

We sincerely invite all candidates whose experience and enthusiasm meet our requirements to forward a resume in strictest confidence to:

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Supervisor of Employment
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R & D firm is seeking Computer Center Manager who will have administration and operations responsibilities for in-town DECsystemten installation. Experience required with DECsystemten, PDP-11, telecommunications, hardware maintenance, system design and implementation. Requires a manager capable of working with scientific users. Sleeves up job with heavy demand in a cost conscience environment. Competitive fringe package. Send resume and salary requirements to:

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Datapoint Corporation has numerous openings at its corporate headquarters in San Antonio and in its field sales and service offices for qualified professional assistance. One of the fastest growing companies in the entire computer industry, Datapoint is the acknowledged leader in dispersed data processing technology. We seek talented people in many disciplines who can contribute in a meaningful way to our continued growth. Attractions include excellent compensation and fringe benefits, an outstanding work environment and the opportunity for rapid advancement into management positions. Listed below are some of the positions for which we seek qualified applicants.

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Outstanding opportunities in field sales. Applicants should have 3 to 5 years successful sales experience with a computer hardware or service company. Knowledge of communications and business oriented applications and systems desirable.

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Applicants should have one to three years experience in servicing computers and/or related peripheral equipment, and be able to maintain good customer relationships. Some travel required.

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Immediate opening for qualified individuals with 3-5 years programming experience and at least 1 year in business applications and telecommunications. Should have good experience in providing software/hardware consultant services to computer users.

ELECTRO/MECHANICAL and MECHANICAL DESIGNERS

Duties include handling complex design assignments, preparation of design layouts and sketches. Requires minimum of 4 years design or electro mechanical drafting experience.

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To design, program and document software systems for use on our equipment. Should have 3-5 years telecommunications programming experience and be familiar with communications software and assembler level programming.

SYSTEMS TECHNICIANS

To "troubleshoot" and repair our full product line. Should be familiar with software testing techniques for digital processors and with operation of a wide range of peripheral equipment including printers, interfaces and mass storage devices. Graduate of a recognized technical school and 3-5 years appropriate industry experience

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Must have a thorough knowledge of digital electronics and be able to test and troubleshoot digital circuits and sub-assemblies Military electronics experience useful.

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To design test equipment and generate test programs for data processing products. B.S.E.E. degree, or equivalent, with three or more years experience in digital design and assembly language programming.

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Need qualified managers for our electronics/electromechanical components purchasing functions. Should have a minimum of 10 years industry experience.

PURCHASING EXPEDITORS

To handle expediting of purchases to insure component availability in support of our production requirements. 10 years experience.

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Will be responsible for material scheduling, reporting, follow-up and preparation of bill of material pertaining to manufactured hardware. Must be able to work from engineering drawings, familiar with scheduling techniques such as Gant, PERT, Milestone and Line of Balance. Should have three to five years experience.

Send resume including
salary history in confidence to:

Mr. Don Whynott, Manager of Recruiting and Employment, Datapoint Corporation, 9735 Datapoint Drive, San Antonio, Texas 78284

Visit the Datapoint booth at the NCC, #3250

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Outstanding opportunity for Systems Engineers with proven performance record seeking position with direct user contact. Applicant should have three to ten years experience in systems design, programming, implementation, and maintenance in an IBM OS or VS environment with ALC BTAM and or ALC BDAM. Conversion skills, ANS COBOL and CICS experience a definite plus. Positions exist at the systems engineer and senior systems engineer levels. Large Dallas based firm with excellent benefits. Compensation is commensurate with qualifications. Send resume with salary requirements to Assistant Vice President–Staffing and Development, P.O. Box 2699, Dallas, Texas 75221.

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M.S. or PhD in Electrical Engineering or Computer Science and five years experience in hardware and software design of real-time computer systems.

Language Processor Designers
M.S. or PhD in Computer Science and three years experience in development of programming languages, compilers, translators, assemblers and link editors.

Software System Designer
M.S. in Computer Science or Engineering and five years experience in design of software systems for real-time and interactive systems.

Programmers
B.S. in Computer Science, Math, Physics, or Engineering and programming experience with higher order languages such as Fortran, Pascal or PL/I. Both scientific and real-time programmers are required.

Positions are also available for people to develop system software, and to analyze the design of Texas Instruments' super-computer, the Advanced Scientific Computer.

Openings for these positions are in Dallas, Texas, Austin, Texas; and several other cities in the U.S., such as Huntsville, Ala.; Princeton, N.J.; Ridgecrest, Calif.; and Washington, D.C. **U.S. Citizenship Required.**

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Need solid insurance and EDP experience. High visibility. Good growth potential.

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2-4 years experience in COBOL/BAL with IBM, NCR or Burroughs OS or DOS background.

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69 West Washington St., Chicago, IL. 60602 (312) 332-2341, 40 Marietta St. N.W., Atlanta, GA. 30303 (404) 577-9630. An executive Recruitment & Placement Agency for the Financial Community.
Other Offices: Dallas-New York-New Jersey-Houston-San Francisco.

Software Support Specialists

We currently have openings within our Home Office Software Support group for individuals who are performance oriented, hands-on doers seeking challenging career and professional growth. Successful applicants will have a solid background in systems and applications programming. They will also have demonstrated problem solving and communications skills in one of the following areas:

- Communications and Networks — You should have a field support/systems programming background in computer based communications/networks products for small, medium, and/or large scale systems.
- Message Control Systems — You should have extensive experience with the architecture of a monitor operating system (DECsystem-10 Monitor 6.02 or later, most desirable.)

You will be required to provide technical and planning support through successful interaction with Software Development, Product Line Management, Digital field organizations and Digital customers.

Educational Specialist/ Instructors

Several opportunities exist for qualified individuals who are interested in joining our sophisticated Educational Services Organization. We're looking for persons with 2-3 years field experience, as well as the proven ability to instruct adults in an industrial or military environment.

Hardware Specialists

Your background should include extensive work with processors, mass storage devices (tapes and disks), I/O devices (card readers and line printers), Data Communications, and operating systems on small and medium scale computers, and/or large time-sharing systems.

Software Specialists

You should have 3-4 years data processing experience in a commercial environment. A working knowledge of file management and data base concepts is desirable.

Openings exist in both Customer Training and In—house Field Service Training. Some travel is required.

Please submit detailed resume and salary requirements to Sue Gulo, Digital Equipment Corporation, Dept. K531, 162 Main Street, Maynard, Massachusetts 01754.

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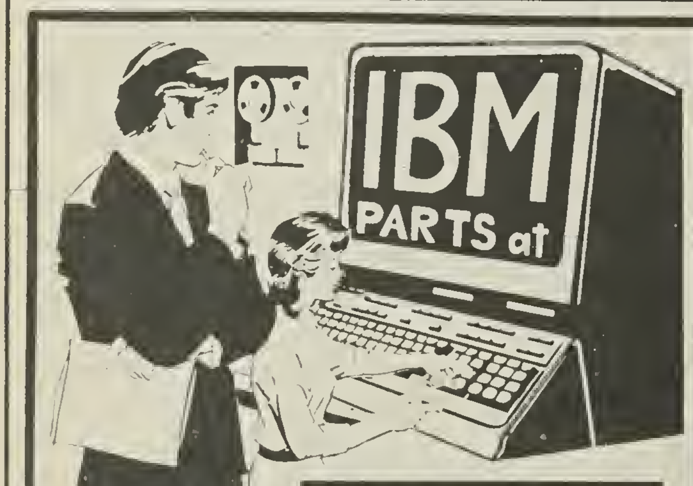

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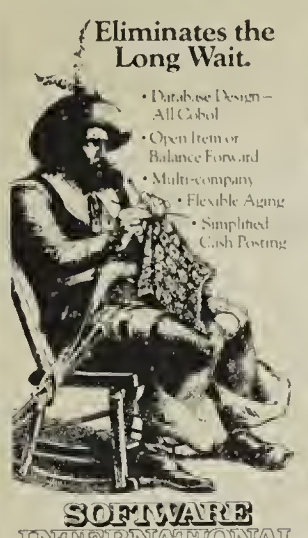

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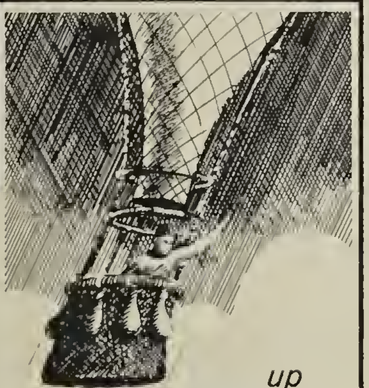

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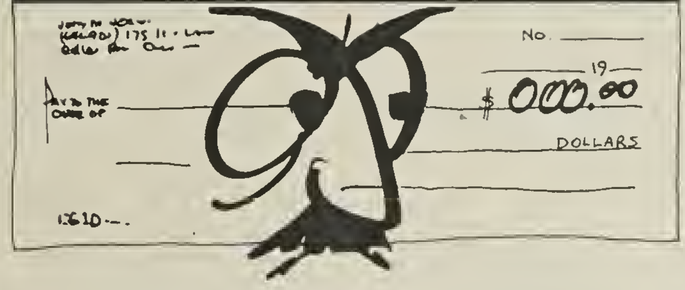

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HP Net Slips as Revenues Rise in Half-Year

PALO ALTO, Calif. – Hewlett-Packard Co.'s (HP) second-quarter earnings were off 1% from those of a year ago and its six-month earnings dropped 8% while revenues rose 13% and 12% respectively.

During the second quarter ended April 30, earnings totaled $23.8 million or 86 cents a share compared with nearly $24 million in the same period last year.

Revenues for the second quarter reached $279.8 million compared with $248.4 million in the same 1975 quarter.

For the six months, earnings were $38.8 million or $1.40 a share compared with nearly $42.4 million or $1.54 a share during the year-ago period.

Half-year revenues rose to $515.4 million compared with $460.4 million a year ago.

Incoming orders during the second quarter totaled $271.5 million, an 8% gain over the $250.4 million booked in the corresponding 1975 period, according to President William R. Hewlett.

For the six months, orders amounted to $550.7 million, up 12% from a year ago, he added.

"It is encouraging to note that our sales and earnings increased substantially from the first quarter of 1976 to the second," Hewlett said.

"Second-quarter orders of $271.5 million were down 3% from the record level of $279.2 million reported in the first quarter, due almost entirely to weakness in the international area," he observed.

"International orders amounted to $131.2 million, down 11% from the first quarter. Domestic orders rose 6%, however, to $140.3 million.

"For the first half of the year, international orders totaled $278 million, a gain of 11% over the first half of 1975. Domestic orders were up 14% to $272.7 million," Hewlett said.

REI Shows Improved Six-Month Results

DALLAS – Recognition Equipment, Inc. (REI) turned in higher earnings on lower revenues in the second quarter, but both earnings and revenues improved in the six months ended April 30.

During the three months, earnings rose to $1.5 million or 25 cents a share compared with $694,000 or 12 cents a share in the same period last year.

The firm said the 1976 period figures included a $700,000 provision for costs to be incurred from a field retrofit program on certain equipment.

Second-quarter revenues declined to $16.7 million compared with $18.7 million in the same period last year, which included $6.9 million from the purchase value of equipment on which REI recorded essentially no profit, the firm said.

For the six months, revenues rose to $33.3 million compared with $29 million a year ago. The figures included revenues from noncancelable long-term leases treated as sales of about $6 million and $3.3 million respectively.

Half-year earnings rose to nearly $3 million or 51 cents a share, including a $1.1 million tax credit, compared with earnings of $1.3 million or 24 cents a share in the same 1975 period, when there was a $741,000 tax credit.

At April 30, the backlog of firm orders, excluding development contracts, for both lease and purchase of equipment was $39.8 million in purchase value, up from the $38.5 million reported a year ago.

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Cambridge Memories, Inc. has obtained an $18 million line of credit with three banks.

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Time Brokers, Inc., which markets used computers, has changed its name to **Computer Merchants, Inc.**

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Anacomp's directors have approved a 5 for 4 split of common. The transaction will be effected through a 25% stock dividend, which maintains the par value per share at $1. The distribution was made April 15 to holders of record March 29.

Wyly Cites Datran Start-Up Costs In $5.2 Million First-Quarter Loss

DALLAS – Wyly Corp.'s first-quarter loss increased to $5.2 million from a restated $2.6 million a year ago.

The company's cash needs, which continue to be substantial and pressing, were significantly affected by the 1976 first-quarter loss, according to Sam Wyly, the company's chairman.

The first-quarter figure included a $4.4 million start-up loss from its Data Transmission Co. (Datran) unit as well as a pretax contribution of $682,000 from University Computing Co.

The firm managed to reduce debt interest expenses to $900,000 compared with $2 million in the same period last year.

For the three months ended March 31, revenues rose to nearly $16 million compared with almost $15.7 million in the same period last year.

A $711,000 contribution from discontinued operations helped cut losses in the 1975 period, the firm said.

The 1975 results were restated to reflect in discontinued operations the sale of Wyly's energy services operations as of June 1975; the sale of insurance operations in March 1976; and to report Datran 1975 losses.

MSI Posts Year Earnings in Red Despite Upswing in Fourth Quarter

COSTA MESA, Calif. – MSI Data Corp. managed to improve its fourth-quarter results although it showed a $625,549 loss for the year after a $1.6 million write-off caused largely by its decision to discontinue its Astros supermarket point-of-sale POS business.

Revenues for the year totaled $31.2 million compared with $32.5 million last year. In 1975 the firm earned $1.2 million or 5 cents a share, including a $99,985 credit from the cumulative effect of applying overhead costs to inventories.

The drop in income from continuing operations to $938,805 compared with nearly $2 million last year, resulted principally from an inventory write-off caused by recessionary influences, President W.J. Bowers said.

MSI wrote off $818,000 for obsolete and excessive inventories compared with $150,000 or 8 cents a share last year.

During the fourth quarter, operating income and earnings rose to $493,860 compared with operating income of $236,777 in the same period last year.

But the write-off of Astros-related business diminished the year-ago quarter's earnings to $34,784.

Data 100 Rewrites Credit Terms

MINNEAPOLIS – Data 100 Corp. has renegotiated the terms of its $41 million domestic credit agreement with 11 banks.

This will allow it to continue to use all available sources of nonbank funds, including $10 million in total unused commitments of lease proceeds financing and nonrecourse sales, according to Edward D. Orenstein, president.

Under the new agreement, various ratios are being amended, including the calculation of the amount of committed rental revenue to support the borrowing base.

In April, the firm was granted a waiver of its borrowing base provisions when it exceeded the terms.

Data 100's $19 million revolving credit arrangement in Europe was not affected by the new agreement, which extends through Dec. 31, 1977.

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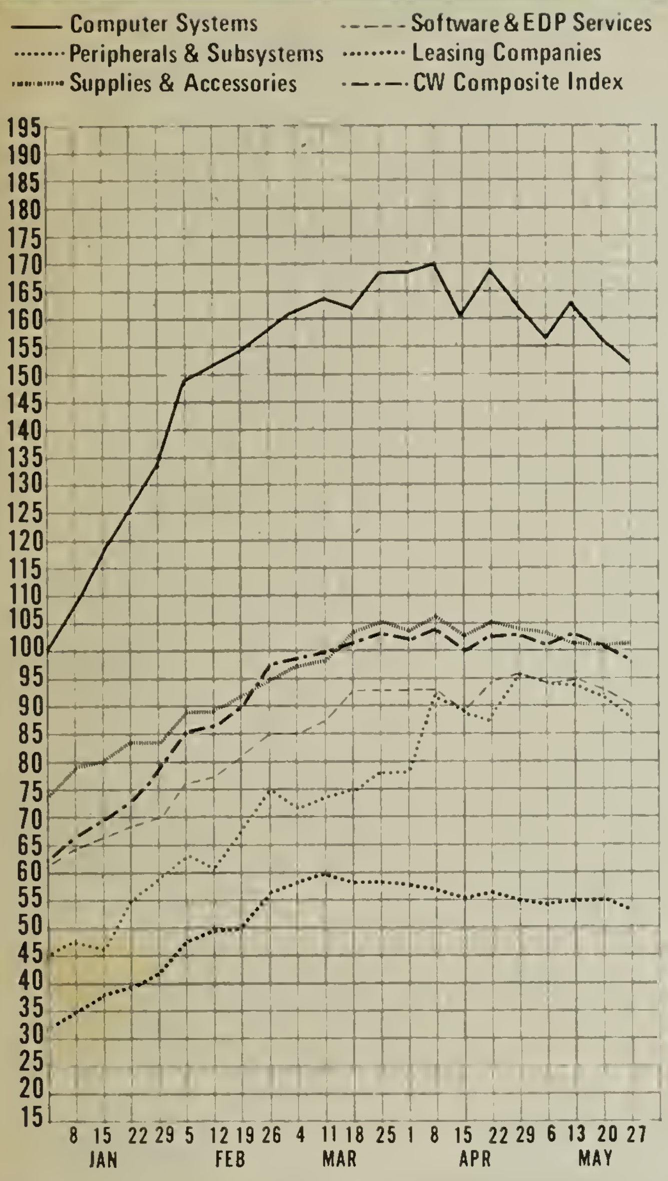

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Earnings	3,555,000	3,120,000
9 Mo Shr	1.09	1.01
Revenue	236,931,000	178,297,000
Earnings	14,455,000	12,453,000

ON-LINE SYSTEMS
Three Months Ended Jan. 31

	1976	1975
Shr Ernd	$.29	$.35
Revenue	3,220,111	2,892,748
Earnings	246,547	289,006
9 Mo Shr	.54	1.40
Revenue	8,294,102	9,033,530
Earnings	459,960	1,170,328

QUANTOR
Three Months Ended Jan. 31

	1976	1975
Shr Ernd	$.08	$.08
Revenue	4,000,000	3,512,000
Tax Cred	86,000	84,000
Earnings	208,000	182,000
6 Mo Shr	.12	.12
Revenue	7,449,000	6,331,000
Tax Cred	143,000	142,000
Earnings	327,000	310,000

TEKTRONIX
Three Months Ended March 6

	1976	1975
Shr Ernd	$1.08	$1.04
Revenue	113,846,000	104,610,000
Earnings	9,502,000	9,021,000
9 Mo Shr	a2.44	b2.25
Revenue	270,914,000	254,603,000
Earnings	21,422,000	19,512,000

a-For 40 weeks. b-For 41 weeks.

NATIONAL DATA
Three Months Ended Feb. 29

	1976	1975
Shr Ernd	$.11	$.10
Revenue	8,110,000	7,913,000
Earnings	577,000	542,000
9 Mo Shr	.26	.28
Revenue	24,701,000	23,191,000
Earnings	1,344,000	1,496,000

NATIONAL DATA COMMUNICATIONS
Three Months Ended Jan. 31

	1976	1975
Shr Ernd	.....	$.04
Revenue	$502,758	693,714
Tax Cred	.....	31,799
Earnings	(169,174)	69,635

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Computerworld Stock Trading Summary

TRADE*QUOTES

CLOSING PRICES WEDNESDAY, MAY 26, 1976

All statistics compiled, computed and formatted by
TRADE★QUOTES, INC.
Cambridge, Mass. 02139

EXCH		PRICE 1976 RANGE (1)	CLOSE MAY 26 1976	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS		3/4	- 3/4	-3.3
N	BURROUGHS CORP	84-108	95 5/8	-3 7/8	-3.8
O	COMPUTER AUTOMATION	10- 19	15	- 1/2	-3.2
N	CONTROL DATA CORP	18- 27	20 5/8	-1 5/8	-7.3
N	DATA GENERAL CORP	40- 60	50 3/8	-2 1/4	-4.2
O	DATAPOINT CORP	24- 45	38 3/4	-3	-7.1
A	DIGITAL COMP CONTROL	2- 4	3 3/4	0	0.0
N	DIGITAL EQUIPMENT	138-181	160	-3 1/2	-2.1
N	ELECTRONIC ASSOC.	2- 5	3	- 1/8	-4.0
A	ELECTRONIC ENGINEER.	7- 16	14	- 1/2	-3.4
N	FOXBORO	28- 42	40 5/8	- 5/8	-1.5
O	GENERAL AUTOMATION	5- 11	7 1/2	- 1/2	-6.2
O	GRI COMPUTER CORP	1- 1	1/2	0	0.0
N	HEWLETT-PACKARD CO	95-117	102 1/2	-1 7/8	-1.7
N	HONEYWELL INC	34- 56	43 1/8	-2 1/8	-4.6
N	IBM	227-272	250	-3 3/4	-1.4
O	MANAGEMENT ASSIST	1- 3	2	0	0.0
O	MEMOREX	18- 33	27 1/2	-2 1/4	-7.5
O	MICRODATA CORP	10- 26	17 7/8	-2 3/8	-11.7
O	MODULAR COMPUTER SYS	9- 13	10 3/4	+ 3/4	+7.5
N	NCR	24- 31	29	-1	-3.4
O	PRIME COMPUTER INC	4- 11	9 1/4	0	0.0
N	PERKIN-ELMER	19- 27	22 1/4	+3	+15.5
N	RAYTHEON CO	45- 54	53 1/4	+ 1/4	+0.4
N	SPERRY RAND	40- 50	46 3/4	-1 1/2	-3.1
O	SYCOR INC	20- 31	24 3/4	0	0.0
A	SYSTEMS ENG. LABS	6- 10	8 1/4	0	0.0
N	VARIAN ASSOCIATES	13- 17	13 5/8	-1	-6.8
A	WANG LABS.	11- 20	11 1/4	-1 3/8	-10.8
	LEASING COMPANIES		5/8	- 7/8	-6.4
O	COMDISCO INC	3- 10	6 1/2	-1	-13.3
A	COMMERCE GROUP CORP	2- 3	2 3/8	0	0.0
A	COMPUTER INVESTRS GRP	1- 3	1 3/4	- 1/8	-6.6
M	DATRONIC RENTAL	1- 1	3/4	0	0.0
A	DCL INC	1- 1	5/8	-	-8.2
N	DPF INC	5- 7	5 5/8	0	0.0
A	GREYHOUND COMPUTER	3- 8	7 1/4	- 1/8	-1.6
N	ITEL	6- 13	11 1/4	- 3/8	-3.2
N	LEASCO CORP	6- 14	11 1/8	+ 1/8	+1.1
O	LEASPAC CORP	0- 1	1/4	0	0.0
O	LPG INC	1- 1	1/2	- 1/4	-33.3
A	PIONEER TEX CORP	6- 9	8 1/8	+ 1/8	+1.5
A	U.S. LEASING	7- 12	9 3/8	- 1/2	-5.0
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	1 1/4	0	0.0
A	APPLIED DATA RES.	2- 3	2 3/4	- 1/8	-4.3
N	AUTOMATIC DATA PROC	54- 67	64 7/8	- 5/8	-0.9
O	COLEMAN AMERICAN COS	4- 6	3 1/2	- 1/8	-3.4
O	COMPUTER DIMENSIONS	3- 7	5 3/8	- 1/8	-2.2
O	COMP ELECTION SYSTMS	5- 9	8	-1	-11.1
O	COMPUTER HORIZONS	1- 2	1	- 1/4	-20.0
O	COMPUTER NETWORK	2- 6	4 1/8	- 1/8	-2.9
N	COMPUTER SCIENCES	4- 8	6 1/4	- 1/8	-1.9
O	COMPUTER TASK GROUP	1- 1	1 3/8	0	0.0
O	COMPUTER USAGE	3- 6	3 5/8	+ 5/8	+20.8
O	COMSHARE	2- 7	5 3/4	+ 1/4	+4.5
O	DATATAB	1- 1	1	0	0.0
N	ELECTRONIC DATA SYS.	12- 16	12 1/2	- 1/4	-1.9
O	INFONATIONAL INC	1- 1	1/8	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1	0	0.0
O	KEANE ASSOCIATES	2- 4	3	- 1/4	-7.6
O	KEYDATA CORP	3- 5	2 5/8	0	0.0
O	LOGICON	4- 4	3 3/4	0	0.0
A	MANAGEMENT DATA	1- 3	2 1/8	- 3/8	-15.0
A	NATIONAL CSS INC	13- 25	19 7/8	- 1/8	-0.6
A	ON LINE SYSTEMS INC	18- 22	19 1/8	- 3/4	-3.7
N	PLANNING RESEARCH	3- 5	3 3/8	- 1/8	-3.5
O	PROGRAMMING & SYS	1- 1	1/2	0	0.0
O	RAPIDATA INC	3- 5	2 5/8	- 1/8	-4.5
O	REYNOLDS & REYNOLD	13- 21	16 3/4	+ 1/4	+1.5
O	SCIENTIFIC COMPUTERS	1- 1	3/4	0	0.0
O	TYMSHARE INC	19- 28	25 7/8	+ 7/8	+3.5
A	URS SYSTEMS	3- 5	3 7/8	+ 1/8	+3.3
N	WYLY CORP	3- 7	3 1/8	- 7/8	-21.8
	PERIPHERALS & SUBSYSTEMS			0	0.0
N	ADDRESSOGRAPH-MULT	8- 13	8 7/8	- 3/8	-4.0
O	ADVANCED MEMORY SYS	4- 10	7 1/2	- 3/8	-4.7
N	AMPEX CORP	5- 8	7 3/8	- 1/8	-1.6
O	ANDERSON JACOBSON	2- 4	3	+ 1/8	+4.3
O	BEEHIVE MEDICAL ELEC	3- 6	6 1/8	+ 3/8	+6.5
A	BOLT, BERANEK & NEW	7- 10	8 1/8	- 1/8	-1.5
N	BUNKER-RAMO	5- 7	5 5/8	- 1/4	-4.2
A	CALCOMP	4- 7	4 1/4	- 1/4	-5.5
O	CAMBRIDGE MEMORIES	2- 6	2 3/4	- 1/2	-15.3
N	CENTRONICS DATA COMP	20- 36	29 5/8	- 3/8	-1.2
O	CODEX CORP	22- 42	36	-2 1/2	-6.4
O	COGNITRONICS	1- 1	7/8	0	0.0
O	COMPUTER COMMUN.	1- 5	3 5/8	- 5/8	-14.7
O	COMPUTER CONSOLES	4- 7	6 1/4	- 3/4	-10.7
A	COMPUTER EQUIPMENT	1- 3	1 7/8	0	0.0
O	COMPUTER TRANSCEIVER	1- 2	1 1/4	+ 1/8	+11.1
O	COMTEN	4- 9	6 7/8	-1 1/8	-14.0
N	CONRAC CORP	20- 25	21	-1	-4.5
O	DATA ACCESS SYSTEMS	1- 3	3 3/4	0	0.0
O	DATA 100	7- 13	9 3/4	- 1/2	-4.8
A	DATA PRODUCTS CORP	5- 11	8 5/8	- 7/8	-9.2
O	DATA TECHNOLOGY	1- 2	1 1/2	- 1/8	-7.6
O	DATUM INC	1- 2	1 3/4	+ 1/8	+7.6
O	DECISION DATA COMPUT	1- 4	1 1/2	- 1/4	-14.3
O	DELTA DATA SYSTEMS	1- 1	3/8	- 1/8	-25.0
N	ELECTRONIC M & M	1- 3	2 3/8	- 3/8	-13.6
O	FABRI-TEK	1- 1	7/8	- 1/8	-12.5
O	GENERAL COMPUTER SYS	1- 2	1	0	0.0
N	HAZELTINE CORP	4- 12	9 3/4	- 3/4	-7.1
N	HARRIS CORP	34- 48	45 1/4	-1	-2.1
A	INCOTERM CORP	9- 20	11 5/8	- 3/8	-3.1
O	INFOREX INC	3- 7	4 3/8	- 5/8	-12.5
O	INFORMATION INTL INC	10- 18	14 7/8	- 7/8	-5.5
O	INTEL CORP	69-109	69 1/2	- 1/2	-0.7
A	LUNDY ELECTRONICS	4- 7	4 3/4	+ 1/4	+5.5
O	MSI DATA CORP	3- 7	5 3/4	- 5/8	-9.8
A	MILGO ELECTRONICS	15- 20	18 1/8	- 1/2	-2.6
N	MOHAWK DATA SCI	3- 7	5 3/4	+ 1/2	+9.5
O	PENRIL CORP	1- 3	2 1/2	0	0.0
A	PERTEC CORP.	3- 8	5	- 5/8	-11.1
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	7- 10	5 1/2	- 1/2	-8.3
O	QUANTOR CORP	4- 5	4 1/8	- 1/4	-5.7
O	RECOGNITION EQUIP	6- 11	9 1/8	- 1/4	-2.6
N	SANDERS ASSOCIATES	6- 11	9 1/8	- 3/4	-7.5
O	SCAN DATA	2- 4	2 5/8	+ 3/8	+16.6
O	STORAGE TECHNOLOGY	9- 13	11 5/8	- 3/4	-6.0
O	T BAR INC	6- 10	6 1/4	- 1/2	-7.4
O	TALLY CORP.	4- 6	5 1/8	+ 1/8	+2.5
O	TEC INC	3- 5	4 1/4	0	0.0
N	TEKTRONIX INC	45- 63	59 1/4	-3 1/4	-5.1
N	TELEX	2- 5	3 1/2	- 1/8	-3.4
O	WANGCO INC	11- 22	19	+2 7/8	+17.8
O	WILTEK INC	2- 2	2	0	0.0
	SUPPLIES & ACCESSORIES				
O	ADVANCED SYSTEMS INC	1- 4	3	+ 1/4	+9.0
O	BALTIMORE BUS FORMS	4- 5	4 1/4	0	0.0
A	BARRY WRIGHT	6- 10	8	- 1/8	-1.5
O	CYBERMATICS INC	1- 1	3/4	+ 1/8	+20.0
A	DATA DOCUMENTS	33- 42	35 1/2	0	0.0
O	DUPLEX PRODUCTS INC	17- 24	17	- 5/8	-3.5
N	ENNIS BUS. FORMS	6- 8	6 7/8	- 1/8	-1.7
O	GRAHAM MAGNETICS	9- 13	10	0	0.0
O	GRAPHIC CONTROLS	13- 19	14 1/2	-4 1/2	-23.6
N	3M COMPANY	55- 65	56 1/2	- 7/8	-1.5
O	MOORE CORP LTD	43- 51	42 3/4	-2 3/4	-6.0
N	NASHUA CORP	11- 17	16 1/4	+ 1/8	+0.7
O	STANDARD REGISTER	16- 19	16 1/2	+ 3/4	+4.7
O	TAB PRODUCTS CO	5- 8	7 1/2	0	0.0
N	UARCO	21- 25	23	+ 3/8	+1.6
O	VANIER GRAPHICS CORP	5- 8	6 1/2	0	0.0
A	WABASH MAGNETICS	4- 8	6 1/8	- 1/2	-7.5
N	WALLACE BUS FORMS	19- 25	21 1/2	- 1/4	-1.1

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
I=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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